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ABSTRACT

A general overview of the Cooperative Assessment of Experiential Learning's Operational Models project is presented. The information is intended to aid other institutions in developing a similar model. Three papers are included: Developing an Operational Model for Assessing Experiential Learning by Warren W. Willingham and Kurt F. Geisinger, Setting and Evaluating Criterion Standards by John Fremer, and Assessment and Accreditation: Economic Considerations by Dean T. Jamison and Barbara Burgess Wolfe. A briefly annotated bibliography is appended. (Author/MV)

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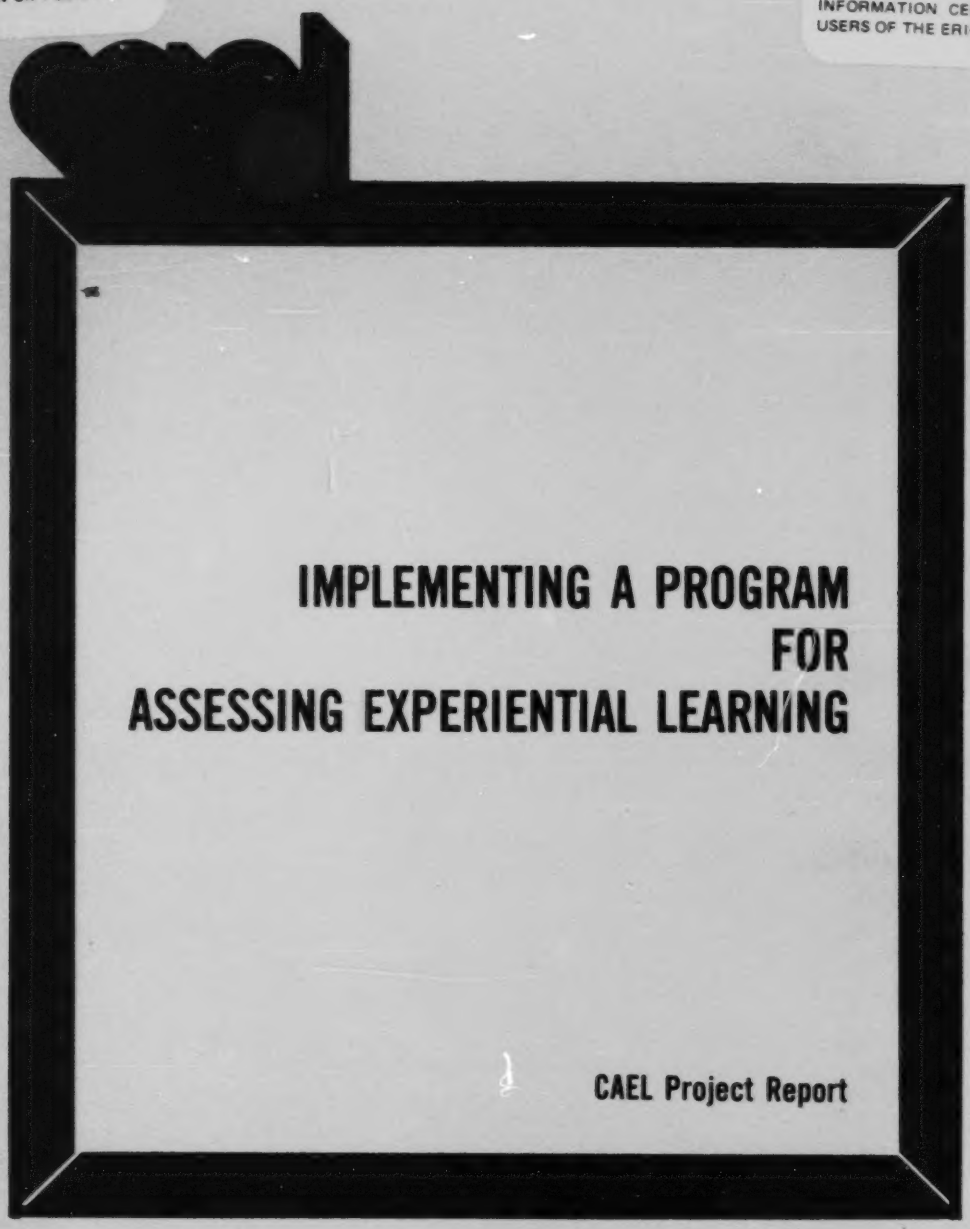

IMPLEMENTING A PROGRAM FOR ASSESSING EXPERIENTIAL LEARNING

CAEL Project Report

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COOPERATIVE ASSESSMENT OF EXPERIENTIAL LEARNING (CAEL)

is a research and development project involving Educational Testing Service and an Assembly of some 200 institutions of higher education and other educational organizations. Its purpose is to advance understanding and practice in the assessment of experiential learning. Funding was provided initially by the Carnegie Corporation of New York and subsequently by the Ford Foundation, the Lilly Endowment, and the Fund for the Improvement of Postsecondary Education.

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CAEL
Educational Testing Service
Princeton, NJ 08540

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CAEL Project Report

Implementing a Program for Assessing Experiential Learning

Edited by
Warren W. Willingham
Hadley S. Nesbitt

Cooperative Assessment of Experiential Learning

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Participants in the CAEL Operational Models Project

Institutions/Representatives

Antioch College
- Ruth Churchill
- Janet Hartle
- Ralph Wolfe

Community College of Vermont
- Laurent Daloz
- Clo Pitkin

The Consortium of the California State University and Colleges
- Barrie Bortnick
- Royce Delmatier
- Helen Cheney Gilde
- Judson Grenier

Delaware County Community College
- Eugene Kray
- Lorraine Hultgren

Florida International University
- Dabney Park, Jr.
- Peter Meyer
- Jules Pagano
- Nancy Wylie

Memphis State University
- Robert Hatala
- Richard Ranta

Metropolitan State University
- James Deegan
- Annie Belle Calhoun
- Charles Libera

Institutions/Representatives

San Francisco State University
- Bernice Biggs
- Edith Arrick
- Thomas Finn
- John Kinch
- Gerry Manning
- Edwin Williams
- Roger Williams

Union College
- Dale Myers
- Joe Thomas

University of Kentucky
- Robert Sexton
- Barbara Hofer
- Ernest Yanarella

University of Oregon
- Norman Sundberg
- Richard Fehnel

Webster College
- R. Lynn Kelley
- Terrence MacTaggart

ETS Staff

Warren Willingham, Project Director
Hadley Nesbitt, Project Manager
John Fremer, Education Consultant
Dean Jamison, Finance Consultant
Barbara Burgess Wolfe, Finance Consultant

PREFACE

Early in 1975 the CAEL project identified three interrelated priorities:

1. The tryout and validation of assessment materials developed in the first year of the project (through widespread experimental use in Assembly institutions and a series of field research studies)
2. The improvement of faculty understanding of the rationale of experiential learning and the techniques of assessing its learning outcomes
3. Developmental work on problems of implementing new assessment techniques into the existing administrative procedures, academic policies, and organizational structures of institutions

Each of these priorities became identified as a principal component of CAEL activity for 1975-76, and projects were proposed that promised to be effective in dealing with these problems. The component associated with the third of these priorities became known as the Operational Models Project and was supported by the Fund for the Improvement of Postsecondary Education. The objective of the project is to create a cooperative context in which 12 institutions would work toward clarification and documentation of desirable working procedures for integrating assessment procedures into their own fabrics; that is, improved operational models. Toward that end an external committee (Leland Medsker, chairman; William O'Connell; and Patricia Thrash) selected the 12 participating institutions listed on page v.

An early step in the project was the organization of a workshop to provide background information, resource material, and a general orientation to the common goals of the project. It was recognized that many other institutions beyond the 12 participants share an interest in the problems and questions addressed in the project. Consequently, the purpose of this report is to make available background material from the workshop to a wider audience of interested persons and institutions who may wish to pursue a similar line of work on their own.

Some additional explanation of the project and the contents of this document may be helpful (see Appendix A for a detailed project description from the original proposal). The basic plan was to select 12 institutions facing rather different implementation problems and to provide a cooperative context for each to devote special attention to its particular concerns over a period of nine months. Some have focused on the problem of defining standards; some have focused on the problem of financing learning and assessment programs. The intended outcome is a series of 12 institutional reports. Each report will describe for one institution an operational model that shows how the assessment process is related to other academic programs and procedures in the institution--a model improved in conception as well as practice, due to the special effort and attention facilitated by the cooperative project.

Educational programs and the context in which they operate are often complex. "Modeling" the process in a useful way is neither obvious in conception nor easy in execution. It is legitimate to ask, What is an operational model, and how does one go about constructing one? In dealing with that question one extreme would be to list specific issues one should deal with in describing such a model, particular documents it ought to include, and the proper format in which it should be documented. It is clear that such a precise definition of an operational model would not be useful, because the nature of implementation problems in different educa-

tional contexts varies greatly. It is not very helpful, however, to suggest simply that every institution interested in such problems should start from scratch. A general orientation and some resources could prove useful even to very diverse institutions. The material in this report was prepared in that spirit.

The first paper, by Willingham and Geisinger, suggests a general approach to developing an operational model--an approach that might lead in many different directions depending upon the nature of the institution and the imagination of the authors. Appendix B cites a number of references organized in the categories suggested in the Willingham/Geisinger paper. The paper on criterion standards by Fremer and the paper on economic considerations by Jamison and Wolfe provide a more detailed discussion of two areas identified for special emphasis in the project.

It is anticipated that most of the 12 institutional operational model reports will be ready for publication and discussion at the CAEL Assembly meeting in the fall of 1976. The reports will surely be of considerable value in illuminating issues and suggesting useful approaches to problems of implementing and properly integrating assessment procedures within the total institution, its programs, and its policies. Through preparation of the papers in this project report, CAEL hopes to encourage additional institutions to give early attention to these problems.

(Eds.)

I. DEVELOPING AN OPERATIONAL MODEL FOR ASSESSING EXPERIENTIAL LEARNING

Warren W. Willingham and Kurt F. Geisinger

Institutions face a variety of problems in introducing procedures for the assessment of experiential learning. This is especially true since experiential learning often has not been acquired under the direct supervision of the faculty and may involve "unusual" competences. While the assessment itself may be a difficult enough problem, assessment of experiential learning is much more complicated than simply having an experienced assessor sit down with a petitioning student. Whether it is done poorly or well, assessment is not an isolated event. It occurs in an existing educational context of people, academic policies, administrative procedures, organizational structures, and so on. Thus, it is not sufficient to specify the techniques through which learning is to be assessed. Institutions must deal with many other problems concerning educational rationale, resource allocation, and accountability.

For example, let us say that a college of business administration plans to develop a new program in actuarial economics that places heavy emphasis upon extended work experience of a particular sort. Assessing the learning outcomes of, say, two terms of relevant off-campus work experience in an insurance firm is likely to involve a host of issues and problems that may not be, strictly speaking, assessment problems but may bear upon the assessment process and may strongly influence the success of the overall program.

In what ways, for instance, would faculty, field supervisors, and students participate in policy decisions regarding field learning objectives of the interns? Who would have final say regarding the amount of credit a student had earned? In what ways would the student's experiential learning be described to third parties? To what extent and in what ways would assessment be treated as an integral part of instruction--both from an educational and from an economic point of view? In other words, designing a program that assumes that part of the learning a student is required to master will be acquired during a term at an insurance company or any such off-campus experience introduces unusual relationships. For this reason, implementing a rational assessment program engages a host of institutional problems that go far beyond evaluating learning outcomes.

There is a need to develop better means whereby institutions might systematically examine the most important problems and implications in implementing new assessment procedures in various types of programs involving experiential learning. A potentially fruitful approach is for individual institutions to develop what might be called "operational models"--i.e., models of how the assessment process operates in particular educational contexts. The purpose of this paper is to describe what is meant by an "operational model" and to suggest some ways that useful models might be constructed.

CONSTRUCTING AN OPERATIONAL MODEL

The intent of the foregoing introduction is clearly to suggest that an operational model is concerned not only with the techniques of assessment, but also with how assessment is related to other parts of a program. In recent years "modeling" and "systems analysis" have become familar terms for the systematic analysis of a complex process. That is, an operational model is regarded as a system of interrelated components, and the task is to describe the components and how they are related. In so doing, one creates a model of the process. Thus, in this context, we are especially interested in how assessment affects and is affected by "other parts of the system;" i.e., academic regulations, administrative structure, financial considerations, faculty attitudes, and so on.

Types of Models

It is important to recognize that "system" and "model" are used here as generic terms. There is certainly no prescribed model or way of building one for the purpose at hand. A useful model should help the reader to understand the dynamics of a particular institutional situation and how to improve practices. Quite different types of models might prove useful in different types of programs or in similar programs at different stages of development. Thus, useful models may vary considerably in the problems they deal with, the way they are structured, or the format in which they are presented. The purpose of this discussion is not to describe a particular model, but rather to suggest a general orientation and a variety of topics--some pieces of which may prove relevant to a given institutional situation.

All good models should, however, share two characteristics. First, they should make it easier to understand how a program operates--especially at critical points of policy and decision. Second, the act of developing an operational model should reveal how a program needs to be improved and serve as a stimulus for initiating the improvements. Thus, the outcome of modeling should be an improved program, and the model itself should, insofar as possible, incorporate documents and procedures that will contribute to that improvement.

It seems useful to differentiate two general types of models--one that can be referred to as a functional model, because it concerns the functions of different parts of a process, and another that can be called a sequential model, because it describes the steps in a process. In attempting to build a functional model, one would first ask, What are the most important components of the overall process? In this case we are talking about implementing a procedure for assessing experiential learning; so the initial question is, What are the most important components of the experiential learning program? The following components can be suggested:

1. Developing a program rationale
2. Defining program characteristics
3. Developing faculty resources
4. Defining criterion standards
5. Admitting students
6. Financing the program
7. Preparing students for assessment
8. Appraising learning outcomes

9. Integrating learning with future plans
10. Coordinating off-campus learning sites
11. Advising students
12. Defining credit policies
13. Recording learning outcomes

Examining the characteristics of such program components and how they are mutually related is one approach to building an operational model. In a subsequent section, we shall describe those components in more detail and suggest ways that they can be used in developing a functional model.

A slightly different approach is to ask through what steps a student must progress in the process of having his or her experiential learning assessed. That is, how does the process appear from the student's vantage point? For example, crediting prior experiential learning involves such steps as the following:

1. Student inquires about the program
2. Appropriate forms are completed
3. Assessment fee is paid
4. Evidence of learning is assembled
5. Portfolio and petition for credit are prepared
6. Learning is assessed, credit is recommended
7. Credit recommendation is reviewed
8. Credit is recorded by registrar
9. Student consults advisor regarding implication of credit for further educational plans

It will be noted that the latter series of steps has an inevitable temporal sequence or order, whereas the former listing of functional components is only partly ordered. These two approaches are parallel but, as we shall see, they yield somewhat different types of models. With either approach, the task implied by a systems analysis or model development would be to identify the critical points and to specify effective ways of dealing with each point. Examples of critical points include instances where policy must be formed or interpreted, where important decisions are made, where procedures are defined or documents designed, and so on. Two large areas of concern are especially critical in implementing assessment programs: financing and standards. These require special mention.

The Importance of Financing and Standards

Financing is a critical aspect of assessing experiential learning, with respect to both cost effectiveness and pricing. The highly individual character of experiential learning often necessitates assessment that is tailored to the specific learning experience. Consequently, some forms of assessment may be technically desirable but prohibitively expensive. The fact that assessment of experiential learning is often closely connected with the instructional process suggests that its cost effectiveness should be evaluated on a different basis from most educational assessment. That is, if assessment of experiential learning is designed to have direct educational benefit, its financing might well be considered to be partly an instructional cost. In any case, it is critical that the costs of potentially expensive assessment procedures be

allocated and priced in ways that can be justified--with respect to maintaining both useful programs and equitable practices.

Definition of standards is another critical issue stemming from the highly individual character of most experiential learning. Students need clear goals and a basis for understanding their personal development. Third parties need clear evidence of learning in order to maintain credibility of programs not supported by time-honored familiarity and academic tradition. Standards may be defined in reference to individual student goals, institutional degree requirements, or requirements set by an external agent such as an employer. In any event, how standards of performance are defined and maintained is commonly regarded as the most basic expression of the academic integrity of a program.

These two functions--financing and defining standards--are obviously essential to an educational program, but there is another reason that both are centrally important in developing an operational model. Each lies at the heart of the "system" of academic policies and procedures within which a program is nested. That is, defining criterion standards of performance in an educational program necessarily engages virtually all major educational questions that can be asked about a learning program. Similarly, thoroughly describing and justifying the financing of a program requires examining all of its important administrative aspects.

Thus, these two topics provide especially relevant foci for model building. Both figure prominently in the 13 functional components listed on pages 2-3, and the two companion papers by Fremer and Jamison and Wolfe deal with standards and financing in detail. Because of these considerations, the remainder of this paper focuses upon the 13 functional components. That is not to say, of course, that an alternate method (e.g., a sequential model) would not be a useful approach to modeling a program.

Steps Toward a Model

Returning to the functional components previously listed, one might develop an operational model through these five steps:

A. Determine the most important issues that need attention, considering the age and character of the particular program.

B. On the basis of the issues identified, focus upon either standards (Component 4), or financing (Component 6), or both, and then select for special attention other components that appear to be particularly relevant.

C. Apply the following six questions to each of the components selected:
   1. What are the major issues involved?
   2. What policies need to be defined?
   3. What documents need to be developed?
   4. What procedures need to be specified?
   5. What policy roles need to be clarified?
   6. What administrative responsibilities need to be assigned?

D. On the basis of answers to the questions in C above, identify specific program objectives and carry out the work that appears most likely to strengthen the program, clarify policy, and improve procedures (e.g., design documents, prepare guidelines, establish policy, define procedures, etc.).

E. Describe the outcome of D above in a report appropriate to the model developed; e.g., a proposal could be an appropriate format for describing how a new activity will operate; a policy statement could be the major outcome of an articulated set of guidelines worked out for several departments within a university; a procedural manual could be appropriate in other cases.

IMPORTANT PROGRAM COMPONENTS

The preceding section provides a general orientation to model building. It emphasizes selection of those program components that are especially important in relation to the nature of the implementation problem at hand and systematic analysis of critical questions concerning the functions of those program components.

Up to now we have done no more than name 13 program components by way of illustration. It is useful to suggest in more detail what those components might involve and what functions they might serve. The following outline is included as a suggestive checklist of items that might be considered in trying to identify critical aspects of a particular model. It is supplemented by Appendix B (page 65), which contains a number of briefly annotated references keyed to those components.

The reader should recognize a certain arbitrariness in the choice of these 13 components and how they are described. The following lists are illustrative, not comprehensive. Also, a given model would likely place emphasis only upon some of these components, especially as they relate to the problem of financing or defining standards at the particular institution.

I. Developing a Program Rationale[1]

A. Philosophical-educational justification

1. Equivalence to actual offered coursework, transfer credit, etc.
2. Recognition of learning that is only possible via experiential learning (as in on-the-job training).
3. Competency equivalencies.

B. Institution-oriented justification

1. Attracting new types of students to the institution.
2. Expanding the size of the student body.
3. Using the institution's resources more efficiently.
4. Responding to faculty interest.
5. Moving into a new (substantive) field or area.
6. Improving, strengthening, or making more relevant a particular existing major or cluster of majors.

[1] It will be noted that some of these components (e.g., Developing a Program Rationale) are mainly concerned with program planning, and the lists that follow them tend to emphasize significant aspects to consider. Some other components (e.g., Admitting Students) may require planning but also reflect day-by-day operation of the program. The lists that follow these components tend to emphasize the sorts of objectives that might be involved.

C. Student-oriented justification

1. Improving accessibility to job market or to graduate or professional school.
2. Decreasing the time required for undergraduate education.
3. Improving breadth of experience and practical relevance of a student's education.
4. Increasing goal-oriented motivation of students.
5. Enhancing self-directed change on the part of the student.
6. Responding to special needs of special groups of students.
7. Enhancing student participation in their assessment.

II. Defining Program Characteristics

1. Administration of the program.
2. Coordination of the program with other institutional affairs.
3. Size of the program (number of individuals involved).
4. Duration of the program.
5. Location of the program, facilities required.
6. General educational objectives of the program.
7. Intended learning outcomes of the program.
8. General character of the processes involved in preparing, educating, and assessing the students in the program.
9. Personnel in the program.

III. Developing Faculty Resources

A. Staffing

1. Additional hiring for the program.
2. Released time for existing personnel to the program.

B. Faculty and staff training in assessment techniques.

1. Extent and character of training needed.
2. Number of staff needing such training.
3. Faculty resistance.
4. Clarification of faculty responsibilities.

C. Relationship between non traditional and traditional academic programs and faculties

1. Joint versus exclusive assignment to experimental and traditional programs.
2. Involvement in policy formation by faculty not participating in the program.
3. Methods for defining released time in experimental programs.

IV. Defining Criterion Standards

A. Basis for standards

1. Institutional requirements.
2. Student goals.
3. Employer requirements.

B. Ways standards can be defined

1. Minimum competence versus levels of competence.
2. Descriptions versus examples.
3. Checklist of skills versus overall level of functioning.
4. Expert judgment versus typical performance of a group of competent individuals.

5. Competence demands in the field versus competence of students in a generally comparable course.

C. People involved in setting standards
   1. Faculty in the program
   2. Other faculty.
   3. Students.
   4. Field supervisors.

D. Properties of good standards
   1. Fairness.
   2. Realism.
   3. Consistency.

V. Admitting Students
   1. Determination of appropriate qualities of prospective students in relation to program objectives and characteristics.
   2. Dissemination of information concerning the program.
   3. Recruitment of appropriate students.
   4. Admission.
      a. Comparison of students against appropriate qualities specified.
      b. Selection or advising students regarding appropriateness.
   5. Administration of financial aid to students.
   6. Orientation of students to the program.

VI. Financing the Program

A. Expenditures
   1. New personnel.
      a. Experts needed.
      b. Consultants versus full-time.
      c. Advisors from other academic institutions.
   2. Released time to current personnel.
   3. Overhead direct and indirect costs.
   4. Cost of alternate procedures.
   5. Equating resource allocations to credit-hours or other standard budget units.

B. Income
   1. Special student fees.
      a. Assessment fee.
      b. Fee associated with credit granted.
      c. Special program fees.
   2. Other income.
      a. Formula allocation of tuition, state funds, or endowment.
      b. Special programmatic allocation.

VII. Preparing Students for Assessment

A. Sponsored learning
   1. Orienting students to off-campus learning possibilities.

2. Clarifying off-campus learning objectives.
3. Developing learning contracts for field experience.
4. Familiarizing student with assessment to expect.

B. Non-sponsored learning
1. Seminars on portfolio construction.
2. Formative advice on portfolio development and how it will be evaluated.
3. Identification of prior learning.
4. Articulation of learning to degree plan.

VIII. Appraising Learning Outcomes

A. Defining requirements for appraisal
1. Documentation requirements.
2. Types of evidence of learning required.

B. Appraisal
1. Measuring nature and extent of competence.
2. Determining whether competence meets requirements or corresponds adequately to learning plan.

C. Evaluation
1. Determining whether credit is to be awarded.
2. Determining amount of credit.

D. Quality control of appraisal
1. Faculty agreement regarding interpretation of standards and matching learning with requirements.
2. Faculty consistency (through time across departments) in appraising competence.
3. Educative benefit of assessment.

IX. Integrating Learning With Future Plans

1. Reporting assessment decisions to the student.
2. Discussing reasons for assessment decisions.
3. Reviewing original objectives with respect to the learning process and its evaluated outcomes.
4. Relating assessed competencies with respect to original objectives, degree requirements, and vocational interests.
5. Discussing in a formative, future-oriented sense the instructional and situational conditions which best fostered learning. Reviewing any which did not.
6. Initiating plans for future learning.

X. Coordinating Off-Campus Learning Sites

1. Locating positions "in the field" that satisfy the program rationale and program characteristics.
2. Placing students in off-campus positions consistent with individual student objectives and desires.
3. Coordinating field living and working arrangements as necessary.
4. Maintaining contact with students and supervisors as necessary throughout the off-campus work.
5. Conducting formative evaluation.
   a. Progress toward learning objectives.

b. Satisfaction with position.

c. Recommendations for remainder of off-campus study.

d. Changes in learning contract.

XI. Advising Students

A. Exploration

1. Values clarification.
2. Delineation of interests.
3. Career exploration.

B. Planning

1. Setting of individual educational goals.
2. Development of a plan for meeting goals.
3. Development of competence statements.
4. On-going review of the plan in a formative, critical fashion.

C. Coping

1. Relating individual goals to learning possibilities that exist in the institution or community.
2. Helping student understand the value and relevance of assessment and learning outcomes.

XII. Defining Credit Policies

1. Delineating the domains of learning in which credit may be awarded.
2. Setting limits on amount and type of credit permitted via experiential learning.
3. Differentiating between records of experience and records of learning outcomes as acceptable evidence for credit.
4. Establishing credit equivalencies for particular competence requirements.
5. Determining procedures whereby amount of credit for unusual learning is estimated.
6. Establishing review and appeal procedures.

XIII. Recording Learning Outcomes

A. Objectives

1. Translating learning outcomes into appropriate academic units.
2. Providing an account of the substance or nature of learning.
3. Characterizing the level or depth of learning to third parties.
4. Monitoring progress toward degree.
5. Serving student needs for credentials.
6. Maintaining archives.
7. Protecting privacy.

B. Recording methods

1. Recording credit hours only.
2. Designating credits for degree, area requirements, etc.
3. Crediting equivalent course.
4. Recording credit and providing narrative description.

RELATIONS AMONG THE ELEMENTS OF A MODEL

It was suggested earlier that systematic analysis of the main components of a program can be

facilitated by asking six questions--questions that help to identify major issues, policy decisions, administrative responsibilities, and so on. There is a seventh question of considerable importance: How are the components related, one to the other? This question is critical because a principal objective in developing a model is to understand better how the total system operates; i.e., how one part affects or depends upon another.

This seventh question applies with equal force to the functional and to the sequential types of models referred to earlier, though the nature of the relationship among elements is different. This is clear both in the way one diagrams the relationships and in the sorts of questions one asks about the relationships.

For example, Figure 1 shows a sequential model of the process through which a student moves in seeking credit for prior nonacademic learning at Governors State University. In this model the elements are clearly steps that define the sequence or order in which a student must carry out prescribed activities. Thus, temporal relationships are important, and all connecting lines move in one direction. For that reason, such a diagram is frequently called a "flow chart." In examining relationships among elements in this type of model, one is especially concerned that successive connections are logical and sound.

In this instance, for example: Is there adequate time to move from Step X to Step Y? Has the student received sufficient advice or information in order to move past a particular point? What policies govern decisions that are made at each relevant juncture? How are decision points monitored? And so on. A good sequential model can reveal weak points and inconsistencies in a complex process; it can also show students graphically what the required procedures are.

The diagram in Figure 2 has a basically different character. It suggests functional relationships among the 13 components previously described. This diagram does not indicate an order of events but rather which elements of the system bear upon which other elements. Thus, "criterion standards" (Component 4) is connected with several other components, and most of the arrows point in both directions. There are a number of such reciprocal relationships indicating that the operations of many pairs of elements in the system are mutually dependent.

This sort of functional diagram has a theoretical rather than a practical application. The value of a functional diagram lies mainly in examining and explicating how one part of a system affects another--especially with a fairly limited group of elements. Illustrative questions are: In what respects does the financing of a program determine admission of students, and vice versa? Are appraisal techniques consistent with credit policies? Does the nature of criterion standards carry out what was intended in the definition of program rationale?

It will be noted that "financing" and "criterion standards" occupy critical positions in this diagram--corresponding to the earlier observation that these two components lie at the heart of the program and tend to determine its administrative and educational character. In focusing upon one of these two critical components the institution needs to identify other important components in its own system that are directly related to that central component and perhaps describe those relationships with a diagram, preferably limited to those system components that are most critical. Such a visual aid can be very helpful in depicting a model but is no substitute, of course, for clear verbal exposition of the critical aspects of the system.

Figure 1

Illustrative Diagram of a Sequential Model Showing Steps a Student Follows Through a Program

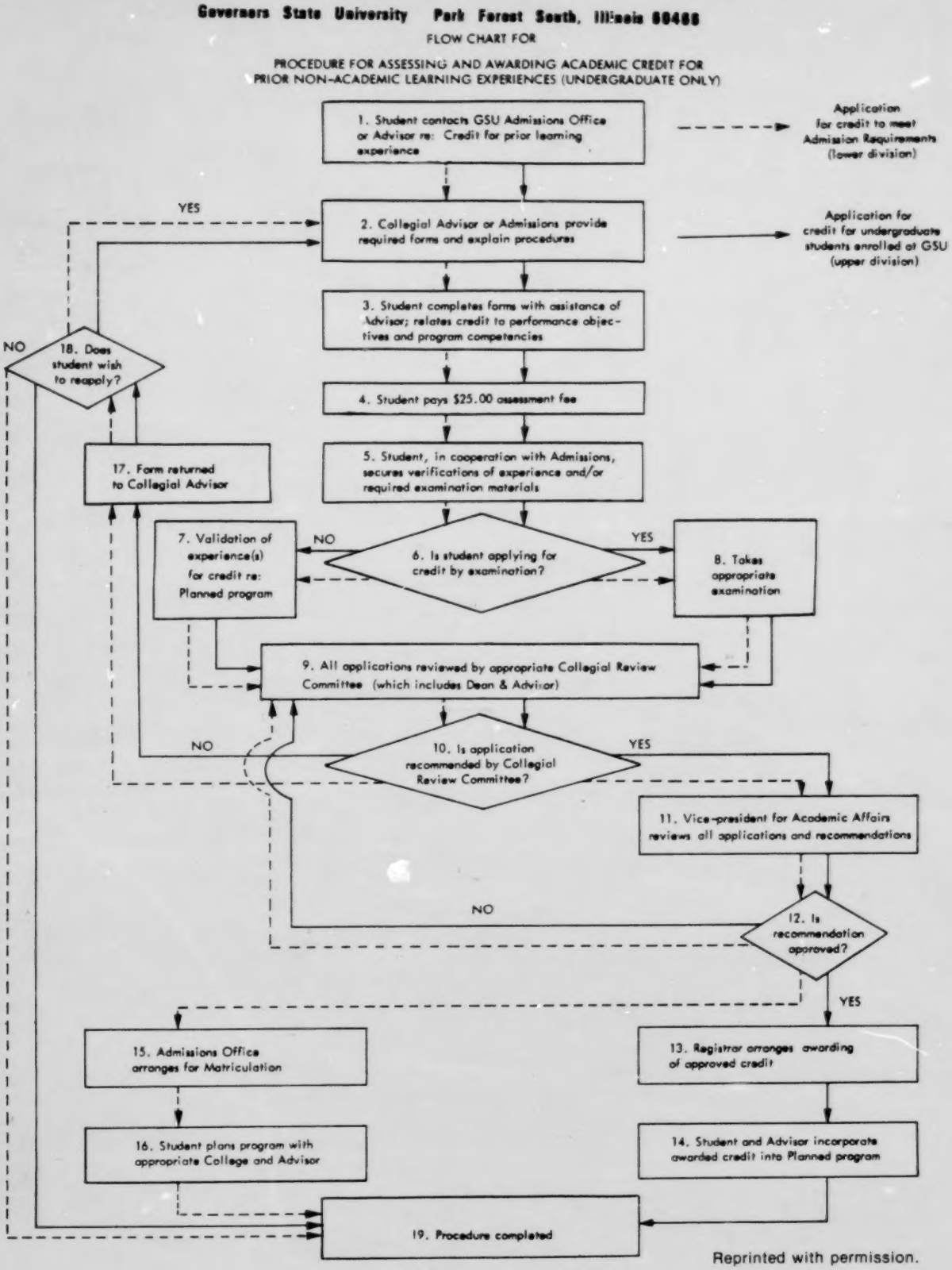
Governors State University Park Forest South, Illinois 60466
FLOW CHART FOR
PROCEDURE FOR ASSESSING AND AWARDING ACADEMIC CREDIT FOR PRIOR NON-ACADEMIC LEARNING EXPERIENCES (UNDERGRADUATE ONLY)
1. Student contacts GSU Admissions Office or Advisor re: Credit for prior learning experience
Application for credit to meet Admission Requirements (lower division)
YES
2. Collegial Advisor or Admissions provide required forms and explain procedures
Application for credit for undergraduate students enrolled at GSU (upper division)
3. Student completes forms with assistance of Advisor; relates credit to performance objectives and program competencies
NO
18. Does student wish to reapply?
4. Student pays $25.00 assessment fee
17. Form returned to Collegial Advisor
5. Student, in cooperation with Admissions, secures verifications of experience and/or required examination materials
7. Validation of experience(s) for credit re: Planned program
NO
6. Is student applying for credit by examination?
YES
8. Takes appropriate examination
9. All applications reviewed by appropriate Collegial Review Committee (which includes Dean & Advisor)
NO
10. Is application recommended by Collegial Review Committee?
YES
11. Vice-president for Academic Affairs reviews all applications and recommendations
NO
12. Is recommendation approved?
YES
15. Admissions Office arranges for Matriculation
13. Registrar arranges awarding of approved credit
16. Student plans program with appropriate College and Advisor
14. Student and Advisor incorporate awarded credit into Planned program
19. Procedure completed

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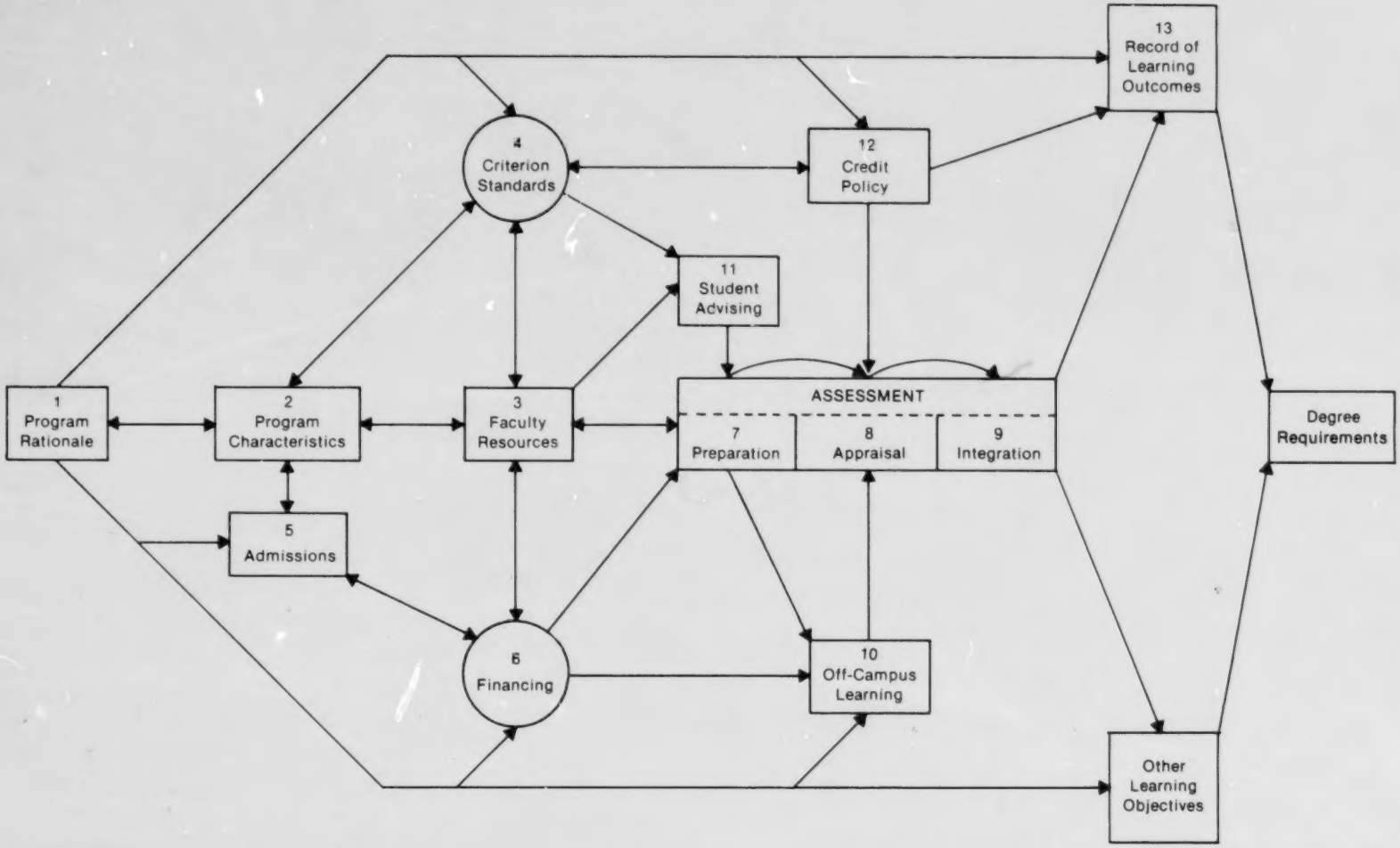
Figure 2
Illustrative Functional Diagram of Components in an Experiential Learning Program



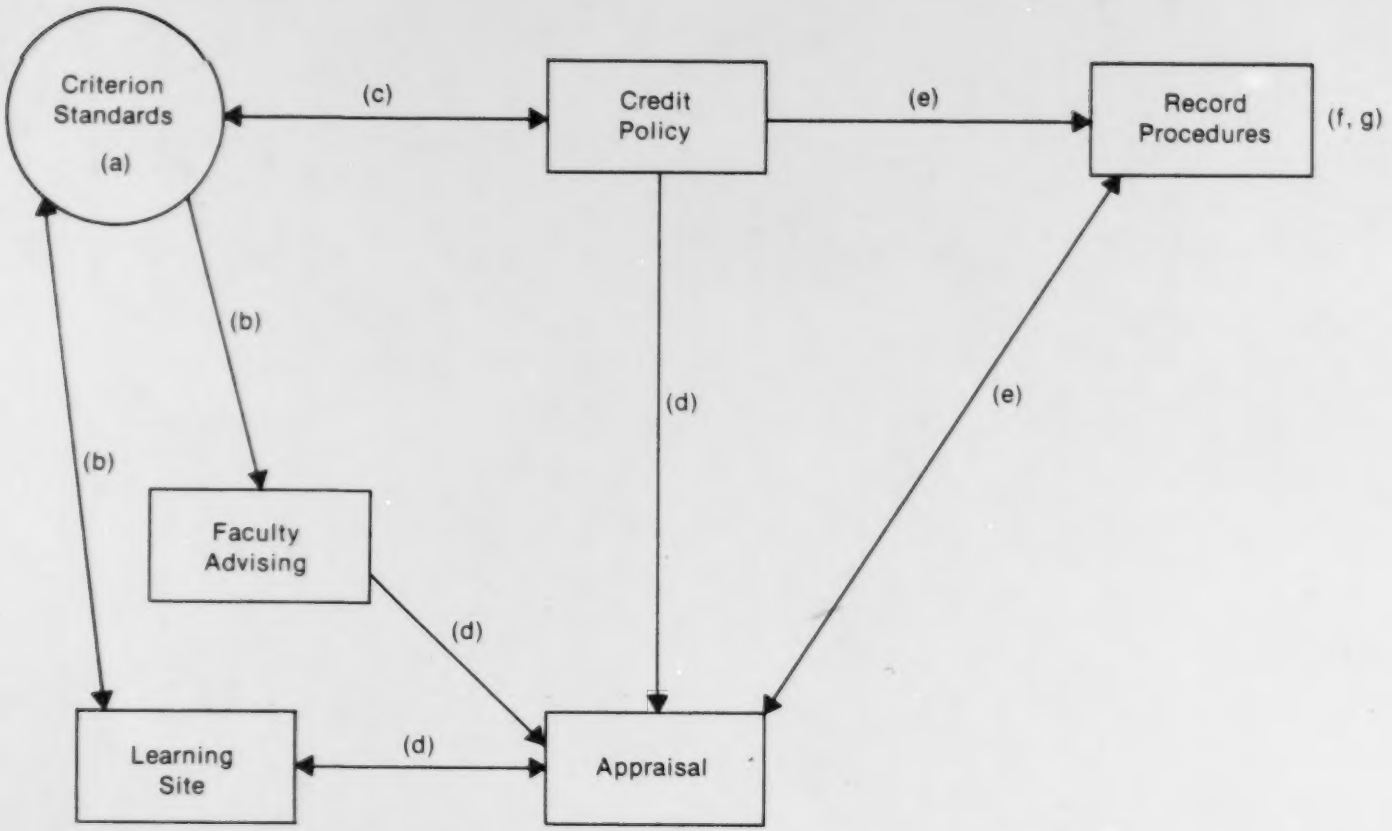
Illustrative Application--Middle State College

It is useful to consider what an institution might actually do in developing an operational model. Suppose a hypothetical "Middle State College" is experiencing some internal questioning because certain administrators and faculty have doubt about the soundness of some of the field work programs that have been developed in recent years. There is a not uncommon feeling that these programs are operating on the periphery of the institution, granting important amounts of credit for learning that is nowhere clearly described, and following ad hoc methods that do not readily permit quality assurance and integration with other college programs and academic procedures.

In an effort to clarify the problem and develop a useful course of action, a faculty committee undertakes a systematic examination along the guidelines suggested in the five steps on pages 4-5, The committee recommends that a study team develop a model of how one particular intern program operates. The committee feels that if such a model could give special attention to the rationale of the intern program and the procedures through which student learning is credited, similar activities throughout the institution might become a more useful and better integrated part of the college curriculum. The committee outlines the charge to the study team as follows:

1. The Task: To develop an operational model describing the rationale of the intern program in the department of Public Administration; to develop policy procedures, and forms as necessary; to document the results of this work in a report to the faculty that can serve as a working prototype for the college and might also be shared with interested persons outside the college.
2. Present Status of the Program: The program is primarily intended to enhance interpersonal skills in dealing with professional problems typical of public administration. The program has been generally successful in operation for two years. Students are positive in evaluations though sometimes critical of site supervisors' inability to focus the learning experience; some faculty doubt that learning is usefully directed to objectives of the educational program; some administrators criticize "ambiguous" procedures (key complaint identified: unclear criterion standards; other relevant components include faculty advising, learning site, credit policy, appraisal and record procedures -- see Figure 3).
3. Specific Study Objectives:
   a. To define and develop faculty consensus concerning the three or four most important interpersonal skills that are clearly related to the educational program and can be learned at most internship sites.
   b. To define several levels of competency of each; to specify and illustrate at each level of competency examples of the types of understanding required, the tasks required, and the capability to perform recognized functions in public administration.
   c. To specify in a formally approved document what credit is to be awarded on the basis of what competencies acquired.
   d. To develop appropriate documents for faculty, students, and site supervisors describing competences, program requirements, and ways students might work effectively toward meeting requirements.
   e. To establish formal procedures and forms as necessary for transmitting, reviewing, and appealing credit decisions.

Figure 3
Program Components Likely to Be Relevant in the "Middle State College" Illustration



Letters refer to specific study objectives a-g listed in the text (see pp. 13 & 15).

f. To develop an approved procedure for periodic review of the adequacy and fairness of assessing and crediting procedures and the continuing relevance of learning experiences to program objectives.

g. To incorporate this work in a report that can be reviewed and approved as a model procedure for other similar programs within the college.

Figure 3 includes the main components under study. The functional relationships indicated in that figure constitute a model of the particular operating system that the college seeks to improve. The various documents, policies, and procedures listed as objectives of the study serve to clarify how each component is tied to the other. For example:

- Objectives (a) and (b) help the faculty make clear to students on what basis they will be assessed, and how activities at learning sites may need to be organized to facilitate achieving desired learning objectives.
- Objectives (c) and (d) translate standards into credit policy and formalize the character and requirements of the appraisal process.
- Objective (e) provides the necessary documents that link policy and practice to the institutional record system.
- Objectives (f) and (g) express concern for the continuing validity and fairness of the assessment procedure and its application throughout the institution (i.e., a written record and an acceptable procedure for periodically re-examining the process).

In Conclusion

What is the outcome or benefit of this model building to the institution and its faculty? There are several benefits that can be of substantial importance, particularly if the effort is undertaken with the potential gain clearly in mind. First, a rigorous intellectual effort is sure to aid the work of those directly involved, especially because it forces consideration of the broader purpose of the program and the context in which it operates. Similarly, clarification of procedures smooths the everyday operation of the program, particularly when there is frequent need to brief new students and faculty. Futhermore, clear procedures and clear rationale in readily available documents also do much to enhance confidence in the program on the part of those individuals only superficially aware of its purpose and operation.

Finally, the clear rationale, the accountable procedures, and the confidence they inspire all serve to insure that the program is an integral part of the curriculum. This "taking root," after all, is a principal criterion of whether the implementation of a new program has succeeded. Developing a useful operational model should help to achieve that end.

II. SETTING AND EVALUATING CRITERION STANDARDS

John Fremer

OVERVIEW

One of the most difficult tasks facing colleges and universities as they seek to evaluate the experiential learning of present or prospective students is that of setting appropriate criterion or performance standards. Potential conflicts that have remained in the background during much of the planning and development of experiential programs must be faced and resolved. Strong commitments to breadth, diversity, and flexibility need to be reconciled with equally strong commitments to credibility, excellence, and quality assurance. In considering these problems, educators in experiential learning programs have paid attention to the kind or kinds of learning that will be deemed creditable and to the degree or extent of learning that must be demonstrated. The issues of kind and degree of learning have raised related issues of the type of evidence of learning to which standards will be applied and, in many settings, the necessary qualifications and training of judges. It is perhaps not too sweeping a generalization to observe that no thoughtful educators have found these tasks easy. Serling (1975, p. 16), for example, comments as follows:

> The issue, of course, is what is of academic value . . . . no one has yet found *the* definitive way to assess nontraditional learning . . . . (but) . . . . most people agree that mere assertions of college-level learning do not constitute proof that such learning has occurred.

The growing and already considerable body of literature on experiential learning offers little assistance on the topic of setting performance standards for the award of college credit. Most writers have limited themselves to observations about the importance of building adequate evaluation into the design of a school's experiential learning program. The mechanics of accomplishing this task have been left largely to those individual institutions that are receiving students with a variety of prior experiential backgrounds or that are planning further sponsored learning programs for students. This paper draws on some of the work carried out at such institutions, particularly Empire State College and Thomas A. Edison College, and reviews a number of topics that must be dealt with in the course of designing and implementing standard-setting procedures for experiential learning programs.

DEFINITION

The phrase "criterion standard" will be used to refer to both the *criteria* for deciding what type of learning will be eligible for college credit and the *level or degree* of evidence of student learning that will be considered adequate for the award of a specific amount of credit. (The phrase "performance standard" has often been used to convey this same meaning and is used interchangeably with "criterion standard" throughout this paper.) It should be noted that a critical first assumption of this paper is that college credit will be awarded only for learning *outcomes* not for learning activities per se. Although it is quite common to speak of a student

earning credit for his or her tenure in a particular position, or for having spent a specified length of time involved in a certain set of experiences, this shorthand should not be allowed to obscure the fact that credit should be awarded only when the learning associated with the experience is of sufficient breadth and depth to meet the standards of the college.

When people think about performance standards for student learning, the notion of a standardized examination comes readily to mind. The "passing score" on a traditional examination is a clear example of a performance standard in that it represents the minimal acceptable level of performance that will result in credit being awarded to the student. This paper contains a rather lengthy section on methods of setting performance standards for traditional examinations. However, it will not be practical, or perhaps even possible, to construct traditional examinations whenever student learning must be evaluated and decisions made regarding the amount, if any, of credit that should be awarded. The bulk of this paper, therefore, addresses the general problem of setting performance standards.

INDIVIDUALIZED EVALUATION

An observation by Harold Hodgkinson (1975, p. 83) provides a useful perspective on the standard-setting process:

> Individualized learning requires individualized processes of evaluation. The more learning is individualized, the more the student needs diagnostic information to perform midcourse correction maneuvers which will make it possible for him to improve on a continuous basis, using feedback from the evaluative process as he goes. Thus, evaluation becomes partially a way of improving, not just measuring, learning. We do want to know whether or not the student attains the goals that were decided; the acquisition of preconceived goals is only one measure of performance and leaves other unintended components of student learning which may be equally useful.

Students seeking credit for prior learning experience have followed diverse and complex paths which have resulted in a variety of patterns of learning outcomes. Evaluation procedures and associated standards should not restrict the opportunities available to the student, as this would be inconsistent with one of the primary goals of the experiential learning movement. It would be inappropriate, therefore, to attempt to measure all experiential learning programs with a single set of assessment methods and to apply a single set of standards to all individuals. This is not to say that colleges should not make every possible use of those examinations and assessment and evaluation procedures that are already available. It will be essential, however, to employ whatever additional assessment methods and standard-setting procedures the learning experiences of individual students require. A useful resource for considering possible assessment methods is *A Compendium of Assessment Techniques* (Knapp and Sharon, 1975). This report provides descriptions of assessment techniques, illustrations of possible applications, a discussion of development procedures, a psychometric review, an overall evaluation, and references for further study.

PROPERTIES OF GOOD STANDARDS

When we see a good set of standard-setting procedures, how shall we know them? Such a question is easier to pose than to answer, but there are some criteria or guidelines for establishing and administering standards and for using follow-up procedures to determine the

effectiveness of such standards. Here is an overview of eight guidelines or principles that are reviewed in the balance of this section:

1. Ethics/Responsibility. Criterion standards should be developed by a process that gives major attention to the needs of students but which recognizes an institution's responsibility to societal needs.

2. Management Standards. Criterion standards should be developed using good management standards or procedures.

3. Definitions of Adequate Learning. Criterion standards should be accompanied by clear definitions of what constitutes adequate learning.

4. Comparability/Realism. Criterion standards should be developed so that there is comparability of requirements for experiential learning and traditional classroom learning. Standards must be set at high but realistic levels.

5. Adequacy of Preparation and Feedback. Criterion standards should be administered with an adequate student advisory and guidance system so that high standards are not accompanied by high failure rates.

6. Consistency/Reliability. Criterion standards should be applied consistently within programs, across programs, and over time.

7. Acceptability/Transferability. Criterion standards should be backed fully by the home institution to increase the likelihood that the resulting credit will be acceptable to other institutions.

8. Student Satisfaction. Criterion standards should be administered so that the students involved feel they have been well served.

Ethics/Responsibility

The issue of ethical responsibility is frequently ignored when educational systems and policies are evaluated. One simply assumes that this issue is part of any such evaluation. However, this factor should be explicitly identified as a significant one. A commitment to meet the educational needs of students should characterize all aspects of the standard-setting process. Adherence to the guidelines summarized in this paper would constitute one type of evidence that a school or program was meeting its responsibilities. Each institution, though, must analyze its own situation to determine the extent to which such constraints as limited time and money are dealt with in ways that adequately serve students.

A commitment to meeting the educational needs of students does not, of course, eliminate the need for colleges to consider the implications for society of decisions made about individual students. As students satisfy degree requirements through experiential learning activities, they move toward the receipt of educational credentials. Keeton (1974, p. 3) makes the following observation about such credentials: "Credentials are power. Those who set the rules of the credentialing game are establishing the routes of access to that power."

As institutions set the rules of the game, they must balance student needs and societal needs. Whenever the completion of a particular program will carry the expectation that a student has acquired certain competencies, an institution's evaluation procedures and standards must be adequate to certify the existence of such competencies.

Management Standards

Turning first to the process by which criterion standards are initially established, it will

be useful to ask whether an institution has followed reasonable management standards. Management standards apply to the steps taken in the design and implementation of experiential programs, so that necessary decisions about criterion standards are made by qualified people in a manner that provides for consistent quality. In traditional college programs where performance standards are set primarily by the individual college professor, management standards apply to the selection of appropriate faculty members. Additional management standards relate to the evaluation of that faculty member's performance by his peers, department chairmen, and perhaps by his students. Since the responsibility for establishing and applying performance standards for experiential learning will not typically be placed on a single individual, it will be necessary to develop procedures that take into account the nature and variety of contributing individuals.

An important first step in evaluating the adequacy of an institution's approach to standard-setting procedure is to determine whether overall responsibility for this task has been defined. The particular individual(s) who hold this responsibility can be expected to vary depending on the nature of the program, department, division, or other part of the institution within which evaluations of experiential learning take place. Although someone with training and experience in the field of evaluation would be best for the job, those without such background are often selected. In such instances, the use of trained evaluation consultants, possibly from other departments of the college, will be essential.

Even when overall responsibility for establishing performance standards can be placed in the hands of a skilled evaluator, many other individuals should contribute to the standard-setting process. For this purpose, it will be useful to seek assistance not only from college faculty and students but also from members of the larger community. This is particularly important when setting standards for the job-related learning of students. For example, the business community would probably be the best source of assistance with the task of setting standards for students' experiential learning of internal office accounting, design of computer systems, development of marketing plans, and the like.

The job of designing and developing performance standards cannot be handled adequately if decisions about particular students must be made under great time pressure. Under such circumstances, which are not unusual in most colleges, the administrators of experiential programs can only fall back on past experience in "regular" programs and hope to avoid excesses at either end of the evaluation scale. Where sufficient time has been allowed, however, developers of standards can give explicit attention to the kind and level of learning that will be required of students. Ideally, any approaches would be tried out with actual students but in an experimental setting where no decisions regarding credit have to be made.

Providing adequate calendar time, and also adequate staff for the development of criterion standards, will make it possible to plan and carry out training programs for outside judges where necessary. Systems can be established for monitoring evaluations as they occur and for following up on the students afterwards. Most institutions will find it useful to adopt an iterative process for developing performance standards. The best available sources of information should be used when setting standards for the first student or group of students who have engaged in a particular type of experiential learning activity. The experience of conducting the initial evaluations, though, should become part of the background for future evaluations. Over a period of time sample student materials can be retained, judges can acquire firsthand

experience with student work and, in general, improved arrangements can be developed for conducting evaluations.

John Valley of Educational Testing Service has suggested the use of an outside "audit" as part of an evaluation of the adequacy of an institution's management standards for setting standards for experiential learning. The notion is borrowed from the area of financial management. A well-managed business concern checks periodically the adequacy of its accounting-bookkeeping procedures by calling for an outside audit. The audit process consists of tracing financial transactions from a variety of starting points using different routes, different systems, and different people. The goal is that of determining whether the same results can be obtained as were produced by the company's basic system. The application of the audit model to the assessment of experiential learning would require the periodic use of an independent assessment method, followed by a comparison of assessment outcomes.

The foregoing guidelines for good standard-setting procedures relate primarily to the planning and managerial skills of the participating staff. There are other criteria that can be applied to the system they design.

Definitions of Adequate Learning

When evaluating experiential learning, a major task facing the evaluating institution is that of determining whether an adequate amount of learning has taken place. The issue is not one of deciding whether or not *any* learning has occurred (some learning is a likely outcome of almost any life experience), but what *kinds* of learning. In some institutions, credit is granted only for out-of-school learning that is equivalent to classroom learning. In other institutions, nonschool learning is measured against criteria unrelated to the content of specific college courses. One attribute of evaluation that is considered in many experiential learning programs is breadth and depth of learning.

The kinds of performance standards set by an institution and the methods of evaluation employed will vary according to the type of learning under consideration. It might be possible to ask an individual to demonstrate certain specific skills that are measured by available examinations or which could be demonstrated in the presence of a review committee. It will often be the case, however, that the student's learning activity has resulted in no readily observable product. Moreover, the student who has learned a method of critical intellectual analysis may need a prohibitively long period of time to demonstrate his or her acquisition of this skill and integration of it into already existing skills. Only after decisions have been made about appropriate measurement procedures can plans be made for establishing adequate performace standards.

To provide guidance to those involved in the assessment and standard-setting process, policy statements and guidelines will be needed.

1. At the institutional or total program level statement regarding credit: Will credit be awarded only for learning that is sponsored, only prior learning that matches existing course content, only prior learning that matches content of courses at some college, or for any comparable learning?
2. General statement for each assessment area regarding the levels of competence to be sought.
3. Specific descriptions of the expected learning at each level of competence, accompanied by samples or models wherever possible.

Reilly (1975, p. 20) offers the following suggestions regarding a procedure that can lead to clear definitions of adequate learning.

> Establish clear criterion standards. This should be done in explicit, observable terms that have a clear meaning for both the assessor and the student.
>
> a. Begin with general definitions of competence or learning that can be applied to all fields.
>
> b. Define specific learning outcomes that should be assessed.
>
> c. Write definitions that can be specifically applied to the area of learning in which the student is seeking credit.
>
> d. Identify critical behaviors or indices that relate to different levels of competence or learning. This is particularly important when the assessment can lead to varying numbers of credits.

Comparability/Realism

As has been noted, a critical issue in the evaluation of student learning and the setting of appropriate standards is whether or not the student will be required to demonstrate learning comparable or equivalent to that experienced by students who pass and receive credit in a regular program. "Comparable" learning is learning that is just as valuable and defensible as a component of a degree requirement as is the learning associated with regular course work. It should be recognized that the greater the difference between an experiential learning activity and the activity of traditional courses, the more complex the task of the institution. In the easiest of cases, the student has been exposed to a fairly well-defined body of knowledge and can be questioned in much the same manner as one would question students who have completed a course in the college catalog. In the most complex cases, however, the judges must consider questions regarding the adequacy of learning without reference to any existing college course. This situation occurs frequently when students have engaged in activities that could only have a counterpart in a special interdisciplinary program.

Critics of experiential and alternative learning programs often use examples drawn out of context to criticize the lack of rigor associated with the evaluation of students' learning experiences. Little attention has been paid to the reverse problem--setting unrealistically high standards. Yet, a common mistake is to exceed the standards that would have been applied to students in traditional college classrooms when reviewing the learning of students in experiential programs. This problem is most likely to occur when the individuals participating the setting or application of standards do not have sufficient direct knowledge of the performance of students in regular programs. It is the responsibility of the institution to provide such assessors or evaluators with guidelines for judging what is reasonable to expect of students before making decisions regarding credit.

Often college faculty and consultants from other institutions or from the larger community work together in the planning and developing of assessment procedures for experiential learning All parties concerned will need to collect and review evidence of what the average student can reasonably expect to learn from each of the programs offered. Interviews with students in regular college programs and reviews of student papers or products will be helpful ways of getting an idea of what is realistic to expect of students. It may be possible to mix examples of work produced in traditional and experiential programs and to ask judges to conduct evaluations. It would then be possible to review the kinds of evaluations earned by traditional students who were

at a barely passing, a medium, or a high scoring level.

Adequacy of Preparation and Feedback

The student who is sufficiently prepared for an evaluation session should be able to anticipate the result. The extent to which such sessions will be predictable will depend on the quality and availability of information about standards and on the effectiveness of the student-advising process. The assessment system and the standards employed can be considered unfair to students if they lead to high rates of failure for students who have worked conscientiously over a period of time. Since the focus of performance standards should be on learning outcomes, not on time spent or activities engaged in, this criterion may seem inappropriate or paradoxical. Why should it be considered unfair if a student has failed to receive credit after working hard? What is unfair is that the institution has not detected that the student was not learning enough and has not acted accordingly. Such oversights need to be carefully avoided since they produce situations in which failure to award credit would seem to penalize an individual student, while awarding credit would compromise the experiential learning program.

As institutions gradually develop their assessment and standard-setting policies, they must pay attention to the consequences of a student's failure to meet a specified performance standard. These consequences can range from minor inconvenience and disappointment to major setbacks and disruptions. For example, if a student has not invested a great deal of personal time and effort in acquiring skills in the area in question, his or her failure to meet the specified performance standard in this setting may be of little moment. The implications of failure, however, can be quite different when the student is seeking credit for a set of prior-learning experiences that were extensive in both breadth and depth. The same situation would apply if a student had engaged in an extensive sponsored-learning program and every indication had been given that credit would be granted as a consequence.

The reverse side of the issue of fairness of course, is that of quality control. If credit is not to be an automatic consequence of any alternative learning experience, what steps can be taken both to maintain quality standards and still make failure a rare occurrence? Some form of ongoing student evaluation and feedback will best serve this need. When sponsored-learning programs are being designed and learning contracts prepared, the advisor and student should agree upon checkpoints at which the student will report to the teacher the progress that he or she has made. This will enable the advisor to detect potential problems in time for the student to revise his or her approach so that it will be possible to award credit when the alternative learning experience has been completed. If the student is unable to adapt satisfactorily to the minimum learning requirement, it would then be both fair and reasonable to deny credit for the alternative learning experience.

These comments apply as well to the question of awarding credit in a fair manner for prior learning. If a student's prior learning was of sufficient breadth and depth to be worthy of credit, a failure to earn credit has to be viewed, in part, as a possible failure on the part of the advisor to provide the necessary guidance and support to enable the student to represent his or her prior learning adequately.

Consistency/Reliability

In implementing established criterion standards, institutions will have to achieve a high

degree of consistency within and among experiential programs and across time. The greater the number of faculty and outside consultants involved in the evaluation of learning programs, however, the harder it will be to achieve and maintain consistency. Moreover, as such programs grow in size, more and more students' lives are affected, and consistency becomes more important as a consequence.

What can an institution do to promote consistency in the application of standards to experiential learning? One very useful method is to design and use training sessions for the judges who will be asked to evaluate students' learning on the basis of background material from prior learning experiences or materials developed in the course of sponsored learning projects. Differences among judges in the rating of identical materials can then be discussed. Under such conditions, judges usually move toward a more consistent understanding of the kind of learning that is to be evaluated and the level of evidence that is required before specified amounts of credit can be awarded. Another strategy is to conduct periodic reviews of the results of applying a particular set of assessment procedures and standards. When individual outside assessors, or committees of assessors, meet to review the results of students' efforts a member of the coordinating group for the experiential learning program could sit in on sessions periodically. If institutional guidelines for applying standards are not followed, a review of background materials and guidelines by participating staff will be needed.

It should be recognized that absolute consistency of assessment can never be attained. Each department or program will need to consider the level of inconsistency that is "tolerable." Clearly the consequences of incorrect judgments will need to be considered and a balance struck among such possible competing factors as student needs and societal needs.

An additional discussion of the issue of consistency is contained in a subsequent part of this paper entitled Reliability and Validity (see p.25). That discussion touches on some of the technical aspects of reliability and presents references for further study.

Acceptability/Transferability

Although arrangements for crediting experiential learning vary from institution to institution, other departments, institutions, agencies, or the like will occasionally need to consider the adequacy of the evaluation and standard-setting procedures that led to particular students earning credit. Neal Berte (1975, p. 95) speaks to this issue as follows:

> In all cases, evaluation is not only one of the most vital components of the learning contract approach in terms of successful experiences and growth for the student, but it is one of the most essential in establishing the credibility of the program and the credibility of student learning for those who must review the program for approval and support, and for others, such as employers or graduate school admission committees, who review students' experiences for credentialing.

When evaluating the adequacy of evaluation and standard-setting procedures, outsiders are likely to raise questions about the evaluation process and level of standards employed. By doing a good job of documenting and explaining the procedures that were followed in designing evaluation methods and in establishing and applying appropriate standards, an institution can increase the acceptability or credibility of the credits granted through its experiential learning programs.

The problem of demonstrating that high enough standards were indeed followed is a more

difficult one. As has been noted previously, experiential learning programs frequently apply standards that are higher than those ordinarily applied to undergraduates in traditional programs. It will always be possible, however, to cite examples of students who have earned what appear to be inordinate amounts of credits for their prior or sponsored-learning experiences. This problem is no different from that faced by traditional programs, however, where critics are fond of pointing out examples of high school graduates who cannot read, college graduates who cannot write, or professional school graduates who cannot function effectively in the profession for which they were supposedly trained. The best an individual institution can probably do is to define clearly the planning, implementation, and monitoring procedures that it uses. The greater the degree of adherence to its policies that can be attained, and thus the greater the consistency in evaluation and standards application that is achieved, the less the justification for criticism.

Student Satisfaction

In addition to satisfying the criteria cited above, an adequate evaluation and standard-setting arrangement should satisfy the majority of the students whose learning has been evaluated. Provision needs to be made for periodic follow-up surveys of students who have gone through the application, planning, and evaluation stages of the credit-granting process at an institution. To what extent do the students feel that they were prepared adequately for the assessment procedures that were applied? Did the standards seem to be fair and realistic? Did they find that preparing for and experiencing the assessment was a valuable learning experience? Was there an air of seriousness about the enterprise that was consistent with its degree of importance to the student's future educational program? Although students who do not earn the amount of credit they had hoped for can be expected to be disappointed, they should be able to recognize the reasonableness of decisions made about the breadth and depth of their learning. If they do not, further investigation of the adequacy of the evaluation system and its application would clearly be called for.

RELIABILITY AND VALIDITY

When developing assessment procedures and establishing standards for experiential learning, the staff members involved will be seeking to achieve adequate quality control and will want, at the same time, to be fair to the students whose learning is to be evaluated. There are two technical requirements, reliability and validity, that must be satisfied before any evaluation procedure can be judged adequate for the student, the college, or the larger community.

The concepts of reliability and validity are most often used to characterize traditional tests, but they apply to any assessment procedure. It should be noted, moreover, that the process of setting and applying standards will always have a significant influence on the reliability and validity of any evaluation approach. Evaluation in this context encompasses assessment, the application of performance standards, and a final decision regarding credit or degree requirements.

Reliability

Reliability can be defined as the dependability or consistency of any measurement or

assessment procedure. It is easy to show that if we were to assess the same group of people again and again with the same or comparable instruments or procedures, we would not obtain identical results on each testing.

Assessment, like any other human endeavor, involves a certain amount of error. The errors can be of two types: (1) Systematic error involves a consistent bias in one direction (a ruler that is too short, a scale that adds five pounds to each weighing, or a test that counts a wrong answer correct). Scores on such defective instruments may be wrong, but they will be wrong consistently, dependably, predictably, and reliably. (2) Random errors, as the name implies, occur by chance. They are temporary and shifting, often due to unknown causes such as fluctuations in mood, health, and motivation. The greater the amount of random error in a measuring instrument, the less reliable it is.

How can a college assess the reliability of the procedures that are being used to evaluate the experiential learning of students? Unless technically trained measurement people are part of the college's staff, it will be essential to seek external assistance to plan and carry out reliability studies. Existing staff can assist with the design and development process and should do so in order to build up their skills in the measurement area. For some additional background on the concept of test reliability, see:

> Reilly, Richard R. The use of expert judgment in the assessment of experiential learning. CAEL Working Paper No. 10. Princeton, N.J.: Educational Testing Service, 1975.

It would also be useful to consult such basic textbooks for measurement courses as:

> Cronbach, Lee J. Essentials of psychological testing. (3rd ed.) New York: Harper and Row, 1970.
>
> Thorndike, Robert L., and Hagen, Elizabeth. Measurement and evaluation in psychology and education. (3rd ed.) New York: Wiley, 1969.

Those individuals interested in a more detailed overview of theoretical and statistical approaches to reliability can see:

> Stanley, J. C. Reliability, in Robert L. Thorndike (Ed.), Educational measurement. (2nd ed.) Washington, D.C.: American Council on Education, 1971, pp. 356-442.

Validity

In addition to its reliability or consistency, the validity of any assessment procedure should also be established--the extent to which it measures what it is supposed to measure. The job of establishing the validity of an assessment procedure is much more difficult in the world of education when student learning is to be assessed than it is in the area of physical measurement where such properties as length and volume are to be measured. It is fairly easy to get people to agree that a ruler is an appropriate measure of length; it often proves quite difficult to get individuals to agree as to precisely what it is that a test or assessment procedure actually measures. It is important, however, for a college to undertake the task of establishing the validity of its assessment procedures and of changing or even discontinuing any assessment procedure that cannot demonstrate its validity.

How, then, can a college undertake to assess the validity of an assessment approach? Professional psychometricians have identified a wide variety of methods that could be used. (The references for this chapter include several that discuss this topic in some detail.) In the

college setting, however, it should be sufficient to investigate content validity and criterion-related validity.

An assessment procedure can be considered to have adequate content validity if knowledgeable and experienced judges agree that it constitutes a reasonable sample of the kinds of skills and knowledge that were identified as the expected outcomes of an experiential learning program. The judges need to become familiar with the anticipated learning outcomes of the program and then to evaluate each of the questions in a test or each of the performance tasks in a performance assessment setting. Since assessment procedures involve only a sample of all the possible questions, tasks, or products that might be required of students, the judges need to decide whether or not an adequate balance is represented. Questions of kind and degree of learning will need to be addressed. Although establishing the content validity of an assessment procedure may seem simple, it is nevertheless crucial. A systematic review of the components of any procedure will often reveal that some of the included elements are indeed not essential whereas certain significant areas of student learning outcomes have been overlooked.

Criterion-related validity is equally important in setting criterion standards. To establish the criterion-related validity of an assessment procedure, it is necessary to compare the decision about a student that resulted from this assessment procedure with an independent decision based on other information. When using a performance-assessment approach to decide whether or not a student should receive credit for an experiential learning program that required him or her to master a certain set of skills, it is necessary to seek other information as to whether or not the student has indeed mastered those skills. For example, a three-judge group might have asked a student to carry out three or four specific tasks under carefully controlled conditions and, on the basis of this information, decided either to award or not to award credit. This type of performance assessment, of necessity, takes place within a certain period of time on a certain day. If the judges had been able to observe the student perform these tasks in a real-life situation over a period of several days or weeks, they would probably have been able to state with some degree of certainty whether or not the student really had mastered these learning outcomes. It would then be possible to compare the decision reached in the college's assessment procedure with the deicison that would have been reached if the more extensive body of information had been obtained.

The task of establishing the criterion-related validity of an assessment procedure can be carried out most efficiently if it is possible to use independent data that are already available. For example, it may be possible to administer an objective examination that was developed to cover the content of a particular college course to students who have taken the course, and to compare scores on the test with grades they earned. This method of establishing the criterion-related validity of a test can be carried out at the same time as information is collected that would lead to the establishment of performance standards for the test.

For a further discussion of the topic of validation, see the discussion by Lee J. Cronbach, "Test Validation," chapter 14 in:

> Thorndike, Robert L. (Ed.) Educational measurement (2nd ed.)
> Washington, D.C.: American Council on Education, 1971.

As has been noted, the reliability and validity of any evaluation approach will depend, in part, on the extent to which a college has achieved clearly defined, realistic, and consistently

applied performance standards. The following section outlines some methods that can help with the task of meeting these difficult criteria.

METHODS OF SETTING PERFORMANCE STANDARDS

The discussion of methods of setting performance standards that follows is based on the assumption that three factors will contribute decisively to any institution's actions:

- The personal development goals of individual students
- The basic educational mission and objectives of the institution, and of the department wherein performance will be evaluated
- The external requirements of other institutions, agencies and the like

The weight given to any one of these factors will vary from situation to situation, but all will influence most decisions about policy and practice in the area of performance standards. There will always be interactions among the factors, and there will be times when serious conflicts will need to be resolved, as when a student's personal development goals do not mesh with any of the alternatives offered by an institution.

One basic determination that each institution will need to make concerns the domains of human endeavor in which it is prepared to make assessments. By what processes will it address and resolve this issue? Consider the case, for example, of a surveyor who has developed certain mathematical competencies. A liberal arts college may or may not wish to assess and possibly credit these competencies. A school of music might choose not to even assess the competencies, whereas a school of civil engineering might indeed wish to conduct such an assessment. Once the decision to conduct an assessment is made and a possible assessment procedure selected, the issue of setting performance standards must be considered.

This section describes and evaluates seven methods of setting performance standards:

- Development of Competence Scales
- Traditional or Arbitrary Method
- Review of Test Questions or Tasks
- Identification of Prerequisite Skills
- Use of Normative Data
- Relationship to Course Performance
- Use of Preselected Groups

Development of Competence Scales

As has been noted, the most difficult evaluation problems in the experiential learning area relate to situations in which the student has acquired competencies that do not match in any neat way the content of specific college courses. Most of the work on performance standards relates to training programs or licensing/certification settings in which evaluators are checking for the presence or absence of well-defined skills. The evaluation of the broader educational experiences for which college credit will frequently be sought will require more than a summing-of-units approach. For such situations it may prove more productive to develop competence scales that include:

- Definitions of a series of functional competence levels (usually 3 to 5)
- Descriptions of the kind of performances that should be associated with each level
- Illustrations (examples, models) of each level

The degree of elaboration of these functional competence levels would necessarily vary both as a function of the amount of student and faculty time that could be devoted to their development and as a function of the amount of available information on the qualities of student learning that should be dealt with in the scale. Suppose a competence scale needed to be developed for a student or group of students entering (or completing) a special internship with a fund-raising organization. The initial step in developing the competence scale might be to list all the areas of knowledge and skill that would be likely to be affected by the experience. A next step could be to determine what level of knowledge or proficiency an experienced fund raiser might have. (Some consultation with an experienced fund raiser would be very valuable in this connection.) Such a step would provide the start for the high end of this competency scale. The other end might be developed by considering the absolute minimum skills that would be considered adequate before someone could be thought of as having any knowledge of fund-raising techniques. Through a combination of armchair speculation, expert review, and trial use, a competence scale could be developed that evaluators would use as a guide to judgments about students.

It would be a heroic enterprise to create a full spectrum of competence scales for every possible set of experiences students might offer for credit. Institutions could move towards such a goal, though, by developing competence scales for the kinds of backgrounds encountered most often. It would then be possible to draw on existing records of student performance and on the comments and experience of the staff and any outside evaluators. Use of a competence-scale approach over a period of years could result in the development of a file of models of scales with notes on their use that would help evaluators facing future scale-definition problems.

A partial sample of the type of competence scale that has been described can be found in the language proficiency scales developed by the U.S. Foreign Service Institute and used for many years with Peace Corps volunteers:

Elementary Proficiency

> Speaking-1. Able to satisfy routine travel needs and minimum courtesy requirements. Can ask and answer questions on topics very familiar to him; within the scope of his very limited language experience can understand simple questions and statements, allowing for slowed speech, repetition or paraphrase; speaking vocabulary inadequate to express anything but the most elementary needs; errors in pronunciation and grammar are frequent, but can be understood by a native speaker used to dealing with foreigners attempting to speak his language; while topics which are "very familiar" and elementary needs vary considerably from individual to individual, any person at the S-1 level should be able to order a simple meal, ask for shelter or lodging, ask and give simple directions, make purchases, and tell time.
>
> Reading-1. Able to read some personal and place names, street signs, office and shop designations, numbers, and isolated words and phrases. Can recognize all the letters in the printed version of an alphabetic system and high-frequency elements of a syllabary or a character system.

Limited Working Proficiency

Speaking-2. Able to satisfy routine social demands and limited work requirements. Can handle with confidence but not with facility most social situations including introductions and casual conversations about current events, as well as work, family, and autobiographical information; can handle limited work requirements, needing help in handling any complications or difficulties; can get the gist of most conversations on non-technical subjects (i.e., topics which require no specialized knowledge) and has a speaking vocabulary sufficient to express himself simply with some circumlocutions; accent, though often quite faulty, is intelligible; can usually handle elementary constructions quite accurately but does not have thorough or confident control of the grammar.

Reading-2. Able to read simple prose, in a form equivalent to typescript or printing, on subjects within a familiar context. With extensive use of a dictionary can get the general sense of routine business letters, international news items, or articles in technical fields within his competence.

Minimum Professional Proficiency

Speaking-3. Able to speak the language with sufficient structural accuracy and vocabulary to participate effectively in most formal and informal conversations on practical, social, and professional topics. Can discuss particular interests and special fields of competence with reasonable ease; comprehension is quite complete for a normal rate of speech; vocabulary is broad enough that he rarely has to grope for a word; accent may be obviously foreign; control of grammar good; errors never interfere with understanding and rarely disturb the native speaker.

Reading-3. Able to read standard newspaper items addressed to the general reader, routine correspondence, reports and technical material in his special field. Can grasp the essentials of articles of the above types without using a dictionary; for accurate understanding moderately frequent use of a dictionary is required. Has occasional difficulty with unusually complex structures and low-frequency idioms.

Full Professional Proficiency

Speaking-4. Able to use the language fluently and accurately on all levels normally pertinent to professional needs. Can understand and participate in any conversation within the range of his experience with a high degree of fluency and precision of vocabulary; would rarely be taken for a native speaker, but can respond appropriately even in unfamiliar situations; errors of pronunciation and grammar quite rare; can handle informal interpreting from and into the language.

Reading-4. Able to read all styles and forms of the language pertinent to professional needs. With occasional use of a dictionary can read moderately difficult prose readily in any area directed to the general reader, and all material in his special field including official and professional documents and correspondence; can read reasonably legible handwriting without difficulty.

Native or Bilingual Proficiency

Speaking-5. Speaking proficiency equivalent to that of an educated native speaker. Has complete fluency in the language such that his speech on all levels is fully accepted by educated native speakers in all of its features, including breadth of vocabulary and idiom, colloquialisms, and pertinent cultural references.

Reading-5. Reading proficiency equivalent to that of an educated native. Can read extremely difficult and abstract prose, as well as highly colloquial writings and the classic literary forms of the language. With varying degrees of difficulty can read all normal kinds of handwritten documents.

(Wilds, 1975, pp. 36-38)

Traditional or Arbitrary Method

When dealing with an examination or set of performance tasks, *the worst of all possible methods of setting standards is to choose an arbitrary percentage of correct responses because that percentage has traditionally been associated with a "passing" score.* The method has its roots in the percent grades which were used almost universally in schools and colleges until about 1920. Unfortunately, this approach (the "judgment uncontaminated by data" method) is the most frequently used process for setting performance standards. The answer to the question "What seems right for a passing score?" usually represents a compromise between those who desire as high a percentage as possible to show their interest in quality education and those who are afraid that their standards will be impossible for the bulk of students to meet.

Clearly, no method that fails to take into account the nature of the learning experience, test questions or tasks, and the students' backgrounds is satisfactory. A performance standard such as 65 percent or 80 percent correct might be reasonable for certain tests for certain groups of students; it may be wildly inappropriate for other tests or sets of performance tasks with other students. *As a rule of thumb, blanket performance standards should be avoided.*

Review of Test Questions or Tasks

This method sets a performance standard for each set of questions or performance tasks used for a specific learning experience. Informed judges examine each question or behavioral statement of a critical task and decide if a minimally competent student could answer the question correctly or perform the task adequately. The performance standard is simply the average number of questions or tasks that each judge has determined should be answered correctly or performed at a specified level of competence by minimally competent students.

One way to improve this procedure in a situation involving a test is to ask each judge to state the probability that a minimally competent person would answer each question correctly. The judges review the records of a number of minimally competent persons and estimate the proportions of such students who gave the correct answer. The sum of these proportions represents the minimally acceptable score. A sample form (Knowledge Estimation Form) for reviewing test questions in this way is included as Exhibit A. Where task review is involved, judges will need to decide on the weight to be given to different aspects such as the kind and degree of learning reflected in the product or performance.

Identification of Prerequisite Skills

This method is clearly of most use when the student's attainment of an ultimate goal is unlikely unless certain prior "enabling" skills have been acquired. Success at advanced calculus, for example, is not likely unless the student has mastered elementary algebra. Similarly, success at discovering original proofs of mathematical theorems is abstract course work is very unlikely unless the student has previously (1) learned how to reproduce (in his own words) standard textbook proofs and (2) become thoroughly acquainted with several *relatively* concrete examples of the theory so as to have a strong intuitive feel for the abstractions. Although most courses or experiential learning programs probably do not enjoy the hierarchical precision of mathematics, the identification of the prerequisite skills method is most efficient at points where decisions are made concerning a student's ability to undertake a new unit in a hierarchical sequence of units.

SC104

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EXHIBIT A

KNOWLEDGE ESTIMATION FORM

Name of Judge _____

Examination Judged _____

Question Number	Estimated Percentage of Minimally Knowledgeable Students Who Know Answer to Question								Question Number	Estimated Percentage of Minimally Knowledgeable Students Who Know Answer to Question							
1	5	20	35	50	65	80	95	DNK	21	5	20	35	50	65	80	95	DNK
2	5	20	35	50	65	80	95	DNK	22	5	20	35	50	65	80	95	DNK
3	5	20	35	50	65	80	95	DNK	23	5	20	35	50	65	80	95	DNK
4	5	20	35	50	65	80	95	DNK	24	5	20	35	50	65	80	95	DNK
5	5	20	35	50	65	80	95	DNK	25	5	20	35	50	65	80	95	DNK
6	5	20	35	50	65	80	95	DNK	26	5	20	35	50	65	80	95	DNK
7	5	20	35	50	65	80	95	DNK	27	5	20	35	50	65	80	95	DNK
8	5	20	35	50	65	80	95	DNK	28	5	20	35	50	65	80	95	DNK
9	5	20	35	50	65	80	95	DNK	29	5	20	35	50	65	80	95	DNK
10	5	20	35	50	65	80	95	DNK	30	5	20	35	50	65	80	95	DNK
11	5	20	35	50	65	80	95	DNK	31	5	20	35	50	65	80	95	DNK
12	5	20	35	50	65	80	95	DNK	32	5	20	35	50	65	80	95	DNK
13	5	20	35	50	65	80	95	DNK	33	5	20	35	50	65	80	95	DNK
14	5	20	35	50	65	80	95	DNK	34	5	20	35	50	65	80	95	DNK
15	5	20	35	50	65	80	95	DNK	35	5	20	35	50	65	80	95	DNK
16	5	20	35	50	65	80	95	DNK	36	5	20	35	50	65	80	95	DNK
17	5	20	35	50	65	80	95	DNK	37	5	20	35	50	65	80	95	DNK
18	5	20	35	50	65	80	95	DNK	38	5	20	35	50	65	80	95	DNK
19	5	20	35	50	65	80	95	DNK	39	5	20	35	50	65	80	95	DNK
20	5	20	35	50	65	80	95	DNK	40	5	20	35	50	65	80	95	DNK

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This method uses pooled judgments, but the decisions are made on the basis of whether or not success on a question or task requires knowledge or skills that are essential to the future application of skills learned in the course or program. The method, in practice, is quite similar to that used in reviewing questions or tasks; it retains the same advantages and problems. But the focus is not on asking if a minimally competent person would get a particular question correct but rather if success on a question or task is required before some specified future activity is possible. A task analysis of the future activity can help to determine what behaviors are required in the performance of complicated tasks. (See Thornton and Wasdyke, 1972, a and b, for a discussion of applications of the task analysis approach to performance evaluation.)

Use of Normative Data

A norm-referenced test or a summary of the products and performances of students in traditional programs can be used to make credit-no credit decisions. Even though this method has empirical elements, pooled judgment is still needed at some stage in the selection of a norming or comparison group. A group must be chosen which is sufficiently similar to the group of interest. In contrast to previously discussed methods in which judgments concerned questions or tasks, judgments in this method concern whether or not a student is just minimally competent. The assessment procedure is then applied to a group of such students. The mean score or average performance of that group may be taken as the minimum performance standard. Using normative data tends to insure the setting of a performance standard that is realistic in terms of the percentage of the population that is judged to have reached an adequate level of performance on the basis of the test. This method has the most ready application to situations in which an objectively scored examination or performance on a standard set of tasks will be the basis for awarding credit.

Relationship to Course Performance

This method can be applied to decisions about credit when an alternative learning experience can be related to the content of a particular course. A test or other measurement procedure that has been selected or developed to be the basis for awarding credit is administered to students completing the regular course. A table or graph is prepared showing the relationship between test scores or performance ratings and grades earned in the regular course. A table can take the form of a grid containing a number of cells. Inside each cell is a number based on the number of people who had scores on the test and grades in the course corresponding to the position of the cell. Usually the data are organized to allow direct readings of probabilities of earning a particular course grade given a test score (e.g., of those who scored in the range 45-50 on the test, what percentage earned a grade of B or better?). Alternatively, scores on the examination could be related to course grades by means of a regression equation, which will give a predicted grade for any given test score. (Warren Willingham reviews possible methods of using course performance as a basis for setting a performance standard in a chapter entitled "Exemption from Requirements Already Mastered" in the book *College Placement and Exemption.)*

When the relationship-to-course-performance method is used, the choice of the test perform-

ance standard is made on the basis of the probability of obtaining various grades. Judgment is, of course, necessary in selecting an appropriate probability. One might, for example, set a performance standard so that there is a probability of .80 that the grade earned in a regular course would have been C (or some other level) or better.

Use of Preselected Group

This method requires that information, independent of the particular assessment procedure being applied, be used to select one group of students who are deserving of credit and another who are not. Instructors' judgments should be used to divide students into the two groups. In making these judgments, it is essential to differentiate course-related competencies from other factors that contribute to grades; e.g., punctuality, consistent attendance, classroom behavior, etc.

The assessment procedure is then applied to both groups, and the distribution of scores obtained. A performance standard is then selected that best discriminates between the two groups.

This method has the important advantage of inherent concurrent validation: the test is validated against independent informed judgments of student competency. Furthermore, this procedure allows the use of classical measures of test quality such as reliability, validity, item discrimination, and the like.

Error of Measurement

The methods of setting performance standards that are described in this paper combine human judgment and empirical data in a systematic process. Regardless of the quality of the procedure, however, some error of measurement will result. This "error" is not attributable to arithmetical mistakes that could be avoided by more careful calculations. Such error is related to the complexity and variability of people and the difficulty of measuring their skills and knowledge. If you were somehow able to achieve complete knowledge of each student's competencies and had a perfect standard-setting procedure, you would be able to detect some degree of error in any operational system.

There are two major types of errors possible in setting standards. If the standards are set too high, the probability increases that those who should receive credit will be classified as not meriting credit. If the standards are set too low, the probability increases that those who should fail will be passed. Clearly, the setting of standards must take into account the costs or losses associated with misclassifications of each type. In every situation, the basic principles for standards of fairness, realism, and consistency will apply, but it will also be necessary to consider the social implications of decisions about students' competencies. Consider the area of driver education, for example, where an incorrect judgment that a student has acquired certain important competencies might have the effect of enabling the student to avoid some needed additional training, allowing an incompetent driver to emerge as a hazard to others.

A Final Thought

The job of setting appropriate performance standards is as critical as it is difficult. Developers of evaluation procedures for experiential programs should allow sufficient time in their projects for a thoughtful analysis of the possible approaches. If at all possible, more than one method of setting standards should then be tried, and the results compared and evaluat-

ed. After this evaluation, a decision can be made regarding the method or methods that will be employed for each assessment procedure.

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III. ASSESSMENT AND ACCREDITATION: ECONOMIC CONSIDERATIONS

Dean T. Jamison and Barbara Burgess Wolfe

As the interest in assessment of experiential learning grows on many college campuses, the problems of cost, pricing, and budgeting for these new programs become increasingly important. The purpose of this discussion is to provide a framework for considering the economics of assessment and accreditation, showing how the economic concepts of cost and efficiency can be applied by administrators, faculty, and others to analysis of and choice among alternative assessment procedures. Although the emphasis is on individualized assessment procedures, most of the concepts are more generally applicable.

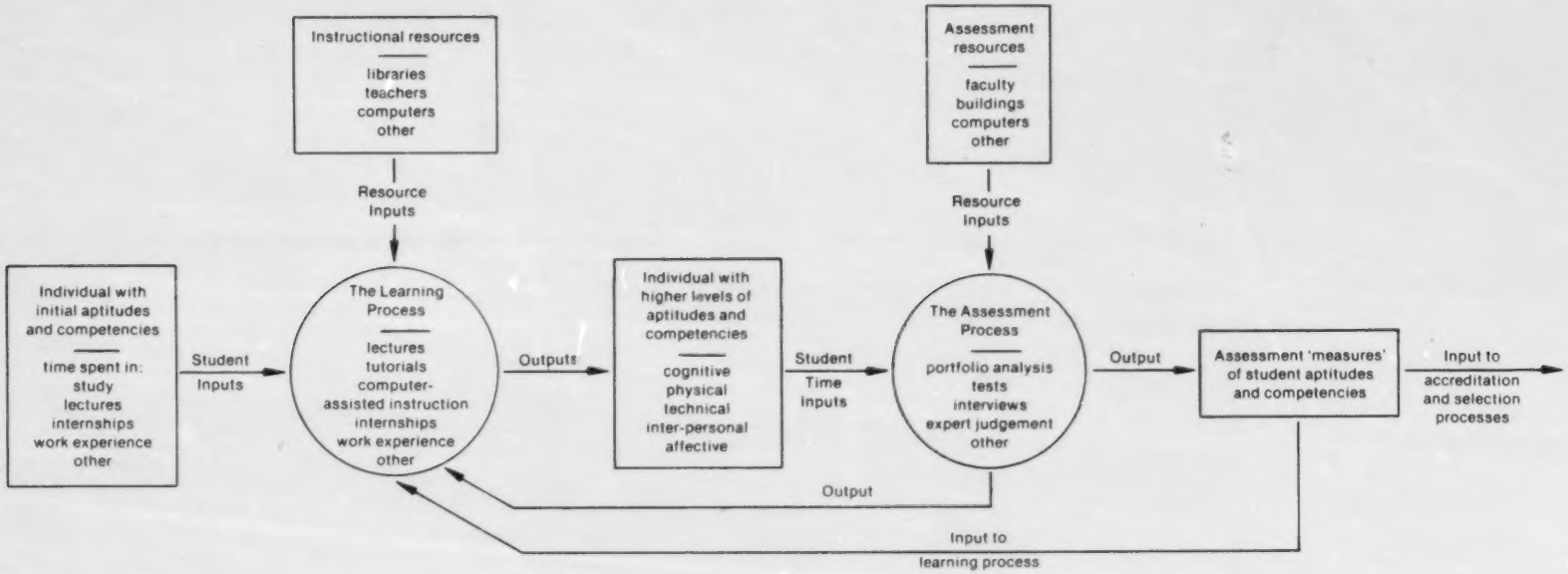
Framework of Analysis

Little work exists to date on either the cost analysis or more comprehensive economic analysis of assessment and accreditation. This is in some sense surprising since testing in the U.S. is by now a multi-hundred million dollar per year industry. On the other hand, testing and assessment have in the recent past been such an integral part of traditional education, and traditional education has been so dominant in the educational system as a whole, that perhaps there was felt to be no separate need to study the cost and economics of assessment; economists focused simply on the economics of education in very general terms and declined to examine the inner workings of the system. At present, however, as instruction in higher education once again becomes unbundled from assessment, accreditation, and licensing, it becomes increasingly necessary to examine separately the economics of constituent parts of the system. The purpose of this paper is to help initiate this effort by examining the economics of assessand accreditation and to raise issues for consideration. Valuable earlier work, principally in the area of cost analysis, has been undertaken by a number of authors--Kray (1974), Kray and Wyman (1975), Meyer (1975), and Stallings, Aleamoni, and Heil (1972)--and our work builds on this previous work.

Figure 1 schematizes the ingredients for economic analysis of the learning and assessment process. The circle on the left denotes the learning process; two of its important inputs are the time of a student and instructional resources such as books and teacher time. The output of this process can be viewed as changes in student competence along a number of cognitive, affective, and skill dimensions. The educational *production function* is economists' terminology for the function that relates input levels to output levels.

The circle on the right denotes the assessment process. As with the learning process, an important input to assessment is student time; in addition there are faculty and non-human resource inputs. The inputs can be combined in many ways through different approaches to assessment--such as portfolio analysis, tests, interviews, and expert judgment. Of course, with any approach there is great variety possible in the overall level and the relative intensity of different resources utilized. The principal output of the assessment process is a set of assessment measures for each student assessed, which may be expressed in a written paragraph or by numbers. This output may then be used in either of two broad ways, as Willingham and Geisinger (1976) have discussed. It may either be used as an input into the learning process (to

Figure 1
The Learning and Assessment Process



individualize instruction or to improve instructional methods) or it may be used for accreditation and certification.[1] In addition, the assessment process itself may have direct pedagogical benefits; Figure 1 indicates this possibility by the direct arrow from the assessment circle to the learning circle.

An economic analysis of assessment alternatives focuses on the assessment circle and the arrows leading to and from it. Cost analysis deals with the arrows leading into the circle; the purpose of cost analysis it to identify all the resources that go into a program, estimate the unit prices for the resources (if possible), and construct a *cost function* that relates total program cost to the levels of the resource inputs. Cost-effectiveness analysis deals with the relations among costs, input levels, and output levels of the assessment process, using the cost function to relate cost to input levels and the production function to relate input levels to output levels. The indices of technical quality (output) of an assessment procedure are, on the one hand, the reliability and validity of the measures that ensue, and, on the other hand, measures of the extent to which the procedure contributes directly to student growth. Putting additional resources into a procedure should make possible increases in reliability, validity, student growth, or some combination of these. Cost-effectiveness analysis illuminates the extent to which increasing the level of resource input affects these outcomes, and how varying the inputs or the techniques affects the costs. Cost-effectiveness analysis does not answer the question of whether it is worthwhile to pay the additional costs required. That decision must be made judgmentally, or, perhaps with the help of cost-benefit analysis.

These concepts can be illustrated with a simple example. Consider an assessment procedure designed to result in a decision about whether to give a student credit for competence in managerial communication. An inexpensive assessment procedure might involve giving the student a two-hour test on the concepts and techniques of managerial communication. An expensive procedure might involve the test plus two hours of face to face interviews and evaluations of the student's interpersonal skills. What does one hope to gain from using the more expensive procedure? The gain is a reduction in the probability of error in assigning credit to the student. By analogy to standard statistical theory, two types of error are possible--the institution can assign credit to a student who does not deserve it, or the institution can fail to assign credit to a student who does deserve it. For a *given* level of resource input to an assessment procedure, there is a tradeoff between probabilities of these two types of error; this tradeoff could result, for example, by varying the cut-off score on an examination. Figure 2 illustrates hypothetical tradeoffs for the expensive versus the inexpensive procedure. Along the tradeoff curve for the expensive procedure the probabilities of making either type of error are lower than they are on the tradeoff curve for the inexpensive procedure.

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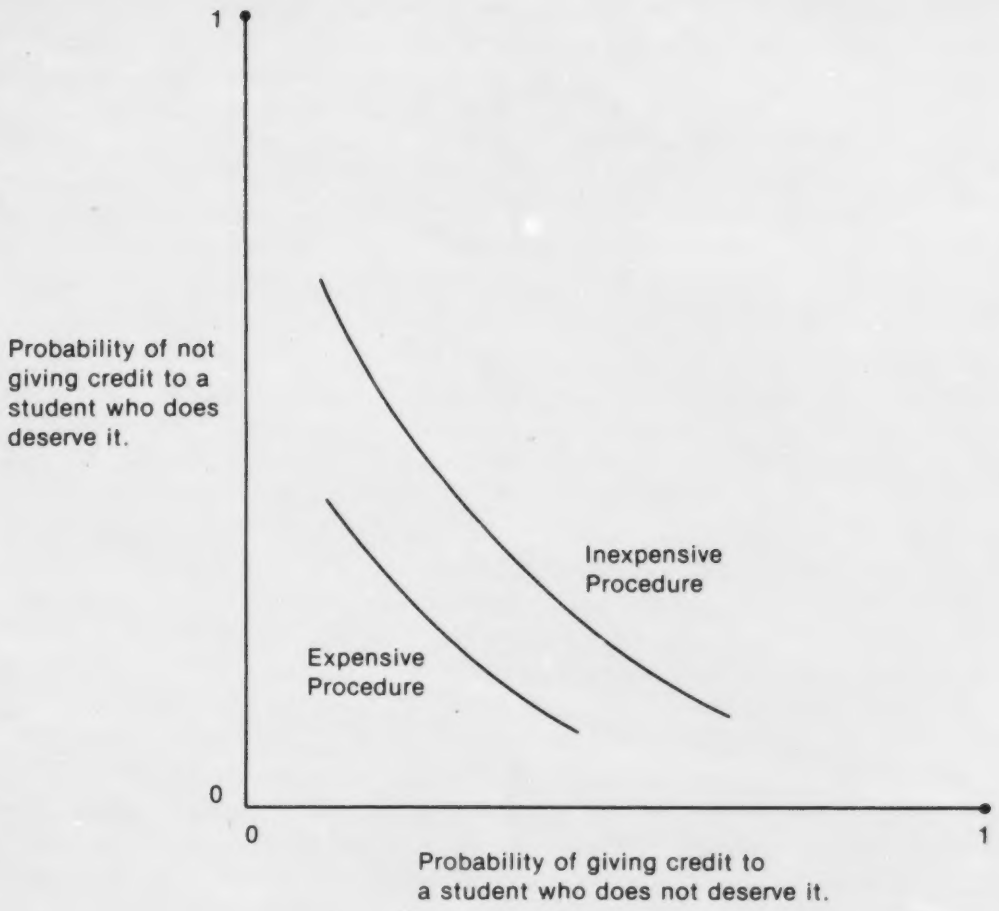
[1] One typically conceives the purpose of accreditation and certification to be to provide information to potential employers or other schools about learning that has taken place. By this conception, the assessment process is a *complement* to the school process. A view increasingly held among economists is that schooling itself is basically a labor market screening process and that whatever learning takes place is incidental (e.g., Arrow, 1974); a natural corollary to this view is that more sophisticated assessment procedures could *substitute* for schooling.

Figure 2
Tradeoffs Among Assessment Procedures


1
Probability of not giving credit to a student who does deserve it.
Inexpensive Procedure
Expensive Procedure
0
0
1
Probability of giving credit to a student who does not deserve it.

Cost-benefit analysis, the final stage of economic analysis, attempts to assign dollar values to the outputs of the process. For example, if outputs are commercially marketed, e.g., aspirins, assigning values is straightforward; one simply uses the market price. However, the government and service sectors rarely can value their outputs by market price; thus more complicated (and occasionally unbelievable) procedures are devised for valuing output. Valuation of educational assessment outputs will be extraordinarily difficult, though the potential emergence of at least a partial market for assessment services might provide useful inputs to solution of this problem. Even without a satisfactory cost-benefit analysis, however, cost analyses and cost-effectiveness analyses can be useful to institutions evaluating the financial implications of alternative assessment procedures.

Resources and Costs

The purpose of this section is to describe how cost analysis can be applied to the process of assessment of experiential learning. Cost analysis of the assessment process begins by identifying and listing the inputs, which are the human and material resources used in the process, then by determining the quantity needed of each of these resources, and finally, by finding the price of or assigning a value to each input. Cost analysis is useful, because once it is done, it becomes possible to ascertain quickly the total cost of alternative variations of an assessment process, or to ascertain which combinations of inputs are feasible and which are not, within a given budget.

Economists are concerned with the allocation of four general kinds of resources--land, labor, capital, and management. Combinations of these four resources are the inputs in the manufacturing world, as well as the educational world, for the production of output. One basic fact that economists deal with is that of scarcity. In other words, all resources are limited and therefore have costs. The costs associated with the resources cited above are rent, wages, interest, and salaries. Cash costs are the direct cash outlays required to obtain or use the resources. Although cash costs are frequently the most important component of cost, often nonmarketed resources will be used in an assessment program; use of these resources may well have an opportunity cost. For example, if resources such as buildings, classrooms, or faculty time are used for one program, such as the assessment process, then these same buildings, classrooms, and faculty time are unavailable for other uses, such as instruction or research. The opportunity cost, then, is equivalent to the value of the alternative uses of the resources that are given up. Administrators with responsibility for planning, financing, and budgeting of programs for assessment of experiential learning must consider both cash costs and opportunity costs.

The first step in analyzing the costs for a process of assessment of experiential learning is to list all the various *kinds of resources* that will be required. Office or classroom space in various buildings will be needed for staff and for instruction or assessment. Labor and management, or administrative, faculty, and clerical time will probably be the largest resource required in the assessment process. The amount of capital, the last kind of resource, depends on the amount and kind of existing resources, such as written materials, and the skill level and training of the faculty. Capital costs here include start-up costs as well as costs for buildings and equipment, if any. Additional resources may thus need to be acquired through an investment of capital.

After listing all the resources, the next step is to identify the *cost per unit* associated with each resource including both cash costs and opportunity costs. If the assessment program will use buildings off campus, then a cash cost in the form of actual payment of rent will be required. On the other hand, if the program is able to use buildings or space available on campus, then the relevant cost to consider is the opportunity cost, which may be zero if idle space is available, or may be the cost incurred by the previous occupants to rent other space off campus or to move to or share other facilities.

Costs of administration, faculty, and clerical time may also be either cash costs or opportunity costs. Cash costs associated with the resource of time include salaries or wages paid to employees hired full-time or part-time to manage or administer the program of assessment. Faculty involved in the assessment process may be compensated by an hourly rate for the time they spend counseling or assessing students. Opportunity costs are associated with time when the total compensation for the individual will not change. Each faculty member has a limited amount of time (a scarce resource) available each day for teaching activities, research, and leisure time. His or her involvement in the assessment process must include an allocation of time to the new program, causing a reduction in time for one of the other activities. The nature of the opportunity cost is the previous use of this time. If faculty members are excited about a new program and give up some of their personal leisure time, then the opportunity cost is borne by the individual. On the other hand, if the school lightens the regular teaching load of a faculty member to free more of his or her time for counseling and assessment of experiential learning, then the opportunity cost to the school will be either an increased work load on other faculty members or less faculty time per student in the traditional programs.

The final step in analyzing the costs of a program of assessment is to determine the *amount* of each resource that will be required. Determining the amount depends on the number of students that the school expects to evaluate each year and the number of different subjects or fields of study that will be evaluated through the assessment process. One difficulty in determining the amount of each resource required is that the number of students who might participate in the program may be directly related to the price charged. Nevertheless, the administrator of the program who has responsibility for analyzing the costs and planning the budget should attempt to determine the number of students, classrooms (both on campus and off campus), and faculty members who will be involved with the assessment program and what initial level of capital investment will be required to obtain certain necessary resources. By following the steps of listing the resources, identifying their cash cost or opportunity cost, and estimating the number of each resource needed, one can estimate the total cost of the assessment process.

For a detailed discussion of how to undertake and use cost analyses in planning educational programs see Jamison, Klees, and Wells (1975); a summary of that methodology appears in the Technical Notes at the end of this paper (see page 45).

Financing and Prices

Financial analysis considers what entity will provide the resources or bear the costs. Possible sources of finance for a program of assessment of experiential learning include tuition payments or other fees received from students, funds allocated to the program from the institution's total operating budget, and funds directed to the program from sources outside the school, such

as government funds and foundation grants. Funds may be allocated to the experiential learning program from the institution's total operating budget without a direct cash transfer, or the salaries of faculty members involved in the assessment process may be paid from the total university budget. These are subsidies, in a sense, and should be treated as income to the program of assessment because they eliminate the necessity for incurring cash costs. If funds from foundations or state or local governments are available, they should be included in total income and allocated to offset the cash costs of the program, unless a more restricted use has been specified by the grantor.

Funds received from student fees may be the major source of income to the program. In solving the problem of what price to set or what fee to charge the students for the assessment process, the economic theory of supply and demand is useful. In this model, students are consumers who have a specific demand for an assessment process, which, for the students, leads ultimately to credits accumulated and a degree. Because the school has limited resources, the supply of assessment that can be provided to students during any one year is limited. In an economic model, price acts as an adjusting mechanism between demand and supply. When demand is high and supply limited, administrators of assessment procedures are free to charge a high price. Likewise, if the supply is abundant and the demand low, administrators will be forced to lower prices, thereby reducing their income.

For any given school and any given program of assessment within that school, the availability of the supply--faculty resources for the counseling and assessment process--is limited. When a price is established so that the amount offered just equals the amount demanded at that price, economists call this an equilibrium price. The price is said to be in equilibrium, for example, when enough students are willing to pay that price to use all the faculty resources that are available. In theory, no students would be left unsatisfied and no faculty resources would be left idle. Therefore, estimating the potential demand for the assessment process, which should be the same number of students used in the cost estimates, is also an important consideration in choosing the price to be charged for it.

In estimating the effect of price changes on revenue, it is important to bear in mind that the demand by students for an assessment of their experiential learning originates from several different sources.

For example, there may be demand for a new program of this type from the students already enrolled who may have experienced prior learning that they now wish to translate into credits. The demand from students for the assessment and accreditation process may lead to a decrease in demand for the traditional education courses and credits. Knowledge of the characteristics of enrolled students' backgrounds, which makes an estimate of demand more realistic, may help to determine an appropriate price to charge students for the assessment process. For example, if many students have participated in some form of experiential learning, but the program of assessment can handle only a few (because of limited faculty resources), then the price should be set high, which would tend to discourage applicants for the assessment process. Setting the price low, on the other hand, tends to encourage more students to apply for the assessment process. Encouragement through a price mechanism may be necessary to attract students to enroll in a new and untested program in order to utilize fully the faculty resources committed to this program. On the other hand, the reverse may be true, where using the price mechanism may

discourage students if insufficient faculty time is available. The decision as to what is a *high* price and what is a *low* price may be facilitated through comparison to the price of the regular academic program or the price of programs offered at other schools in the community.

Another type of demand for these programs of assessment may originate from students enrolled in traditional academic programs at other institutions. Previously, these students may have been indifferent to the academic programs offered at one institution or another, while their demand for a new program of assessment of experiential learning may be substantial. Again, the price mechanism can be used as an incentive where a low price attracts students from other institutions or a high price discourages applicants.

A third source of demand for a new program of assessment of experiential learning may originate from other individuals not in any type of educational program. A totally new market may be reached by this kind of program. Certain adults have knowledge or skills learned on the job or from travel, for example, that they might wish to have assessed, if they could be awarded college credit. In this new market, price probably serves a very important function in equating the demand with the supply. Adults holding full- or part-time jobs will certainly be very price sensitive. A high price, as well as the opportunity cost of leisure time foregone, may tend to discourage adults from enrollment in a new program.

Budgeting

Budgeting, the final step in financial planning, is a process by which the objectives of a program, the available resources, and the interrelations among them are taken into account to achieve a comprehensive plan of action. Because of the need to express all the components in monetary terms, the budget is a financial statement; it is a formal, quantitative expression of how resources will be allocated.

A budget represents the goals and objectives of a program, specifies the policies and steps for achieving them, and states the overall operating and financing plan. A budget is valuable in two distinct ways. First, the process of preparing the budget requires the administrators to plan ahead, anticipating and preparing for changing conditions. Second, the budget itself can be a useful instrument or tool for the administrator in controlling the implementation of the policies and procedures and reaching the predetermined goals. Therefore, a budget is much more than a means for equating income and expenses and is invaluable for all types or organizations and programs, including programs of assessment of experiential learning.

Through the process of perparing a budget, the fundamental problems of distributing scarce resources and making compromises among various objectives can be resolved. First, it is necessary to determine the range of stated objectives. Second, it is necessary to determine the costs of alternative methods for achieving the objectives. Third, it is necessary to determine the optimal size of the total budget. This last decision is the ultimate constraint in the allocation process, and leads one back to the first and second steps to select the most cost-effic'ent methods for achieving the most critical objectives.

A good budget has several characteristics that provide information for planning and management decisions by the administrators of an assessment program. First, a budget should provide a meaningful measurement of the total cash costs of achieving the defined objectives. (A long-range plan should project the total cost stream throuoh the long-range time horizon.) Second,

the budget should facilitate the comparison of costs of alternative methods to achieve a given objective. Third, the budget should clearly identify the future cost implications resulting from present financial decisions. And, finally, a budget should be structured to allow comparison of cost inputs and resulting outputs when components of the process are varied.

Budgeting has traditionally been associated with accounting. In this narrow sense, budgeting is recording what has happened in the past. A knowledge of the past is useful both to provide information about experiences analogous to those of the present and to point to methods for improving on past performance in the future. Consequently, a successful planning and budgeting process will draw, to the extent possible, on evidence about the past as a guide to the future. One of the difficulties in budgeting for developmental programs, which many assessment programs are, is precisely the lack of past evidence to serve as a budgetary guide.

But, as has been shown, budgeting is much more than accounting. When attention moves from the past to the future, two major questions arise separately or in combination. First, how effective is a program in reaching its stated objectives? Second, can the existing program results be accomplished at lower cost? Through the analytical process of planning and budgeting, these questions of effectiveness and efficiency can be answered. Cost-effectiveness and cost-benefit analysis are some measures that indicate how successful an assessment program has been in achieving its objectives. Analytical measures such as these should be relied on by the administrators of the program as well as the officers of the school for both evaluating the past and planning the future.

TECHNICAL NOTES: COST FUNCTIONS FOR ASSESSMENT

There is some literature concerning educational costs, but the methodologies of that literature differ from what is required for adequate treatment of the cost of the assessment process. The reason appears to be that, with the exception of start-up and building costs, concerning which a decision maker usually has little choice, most educational and assessment costs are recurrent. In this section we describe the methodology to handle this problem of cost and allocation of resources. Our methods draw on standard economic theory, but, as often occurs when applying economic theory, minor modifications are required to deal with the problem at hand. We begin by describing cost functions and their properties, with definitions of the concepts of "total cost", "average (or unit) cost", and "marginal cost." We then examine the special case in which it is appropriate to separate costs into "fixed" costs and "variable" costs. We conclude by discussing the situation in which there are multiple inputs to the cost function.

Total, Average, and Marginal Cost

It is useful to think of costs as functions rather than numbers; a "total cost function" for a program gives the total cost required to finance the program as a function of how many students the program reaches. To take an example, let

$$\text{Total Cost} = TC = TC(N)$$

where $TC(N)$ is the total cost required to provide the necessary resources for the assessment of experiential learning of N students.

The "average cost function" (or, equivalently, "unit cost function") is defined to equal

the total cost divided by the number of units of the input provided:

$$\text{Average Cost} = AC(N) = TC(N)/N.$$

Just as the total cost depends on N, so does the average cost.

The "marginal cost function" gives the additional cost of providing one more unit of input (in this example, of providing faculty time for the assessment of one more student) as a function of the number of units of input already provided. Stated slightly more precisely, the marginal cost function is the derivative of the total cost function:

$$\text{Marginal Cost} = MC(N) = dTC(N)/dN.$$

Again, it is important to keep in mind that the marginal cost will also be a function of N.

Fixed and Variable Costs

When the total cost function can be approximated by the simple and convenient linear form,

$$TC(N) = F + VN, \qquad (1)$$

it becomes possible to separate costs into "fixed" costs and "variable" costs. In this example, F would be the "fixed" cost because the value of total cost contributed by the first term on the right-hand side is independent of N; V is the "variable" cost per unit of input because the value of total cost contributed by the second term on the right-hand side varies directly with N. When the total cost function is linear, as in the equation above, the average cost is simply equal to the fixed cost divided by N plus the variable cost ($AC(N) = F/N + V$); the marginal cost is equal to V. Thus the average cost declines as N increases (by spreading the fixed cost over more units) until, when N is very large, the average cost is close to the marginal cost. Figure 3 below provides an example of total and unit cost functions.

Equation 1 is a reasonably good approximation for the cost behavior of processes of assessment of experiential learning. The costs of the preparation of criterion standards and the orientation and training of faculty tend to be fixed independently of the number of students being assessed. Costs of individual interviews and counseling, on the other hand, tend to vary directly with the number of students.

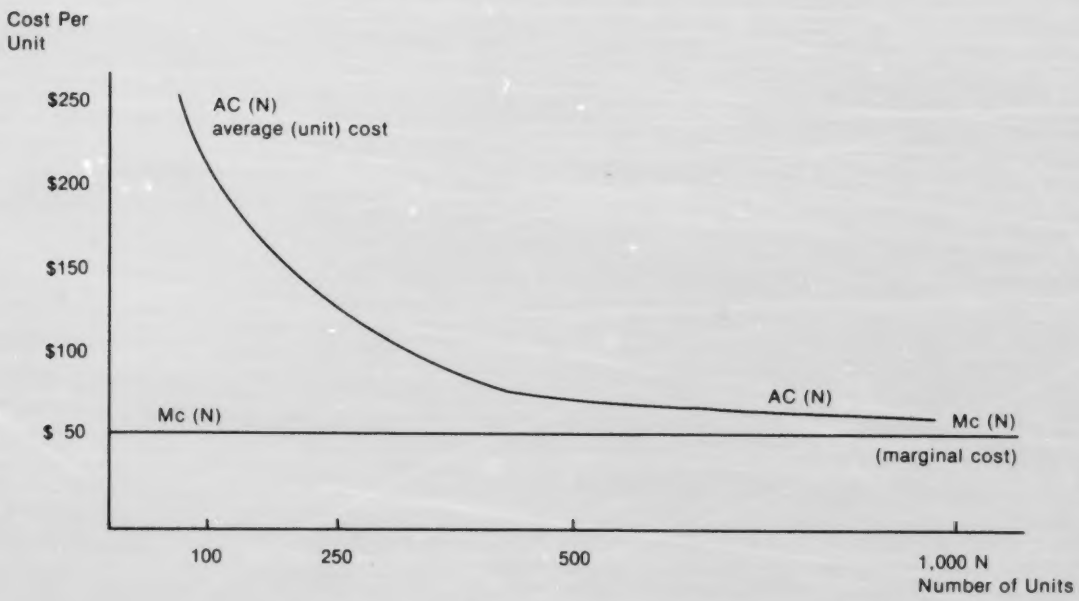
Figure 3 Example of Total and Unit Cost Functions

$$TC(N) = F + V(N)$$
$$TC(50) = \$2{,}000 + \$50(50)$$
$$TC = \$4{,}500$$
$$AC(N) = TC(N)/N$$
$$AC(N) = \$90$$
$$MC(N) = dTC(N)/dN$$
$$MC(N) = \$50$$

Number of Units N	Fixed Costs F	Total Cost TC	Unit Cost AC(N)	Marginal Cost MC(N) = V
10	$2,000	$ 2,500	$250	$50
20	2,000	3,000	150	50
50	2,000	4,500	90	50
100	2,000	7,000	70	50
200	2,000	12,000	60	50
500	2,000	27,000	54	50
1,000	2,000	52,000	52	50

Cost functions are usually expressed in both equation and graph format. Figure 4 depicts how cost curves appear in economic theory. Total cost per unit declines, up to a point, indicating that it is more cost-efficient to produce (or teach or assess) a larger number, until capacity is reached; at this point, total costs per unit begin to increase. Likewise, variable and fixed costs decline as more efficient use of resources is achieved at higher levels of production. Marginal cost (the additional cost necessary to produce one additional unit) begins to increase at the point where the volume of production has just passed the most efficient level of production.

Figure 4
Unit Cost Curve



An occasional source of confusion, even among economists, is between fixed costs and capital costs. There can be fixed costs that are recurrent; an example is regular (biannual) faculty training sessions. Likewise, there can be capital costs that are variable; an example is preparation of criterion standards for one, two, or more different programs or methods of assessment. Thus the concepts of fixed costs and capital costs are distinct, though it is often true that major capital expenditures are associated with substantial fixed costs.

Multiple Inputs to the Cost Function

In the preceding sections we have assumed that the total cost for the assessment of experiential learning depended on only a single variable, the number of students assessed. This is a reasonable approach in the circumstance where one can assume other potentially relevant variables to be fixed. Often, however, particularly in planning new programs it is important to consider explicitly the other variables. In particular, it is important to consider a variable that roughly indexes how many areas of experience, or subjects, the program can provide assessment for. We label this variable A.

While treatment of multiple inputs involves some additional complication, the basic concepts introduced so far change but little. Total cost is now a function of two variables; in our new example,

$$TC = TC(N, A).$$

The marginal costs become the amount total cost changes for a unit change in *each* of the determining variables; in this two-variable example we have two marginal costs defined mathematically by partial derivatives as follows:

$$MC_N = \frac{\partial TC}{\partial N} \; ; \; MC_A = \frac{\partial TC}{\partial A}$$

Each of these partial derivatives can be a function of N and A. Likewise there are two average costs--the cost per student, TC/N, and the cost per subject of assessment, TC/A.

Aside from potential practical complications, then, there is small conceptual difficulty in going from consideration of a single determinant to multiple determinants of cost. In the remainder of this paper we will generally assume single determinants of cost in our analysis of the costs of ongoing methods of assessment,[2] and multiple determinants in our development of general cost equations; this reflects the utility of considering multiple determinants in the planning process. We turn now to more detailed consideration of capital costs.

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[2]In order to let the number of students in the system be the sole determining variable, we occasionally will find it convenient to let the values of fixed and variable cost, F and V, depend on aspects of the system that are assumed to remain unchanged. F will depend, among other things, on the number of offices and seminar rooms used for the program, as well as the various methods of assessment for which validity needs to be demonstrated. Costs of faculty time per student and hence V will depend on the number of students enrolled in or admitted to the program and the different types of learning the students have experienced. If the situation warrents the assumption that these other variables will change little, it becomes possible to use the convenient formulation of equation 1: $TC(N) = F + VN$.

Treatment of Time: Annualization of Capital Costs

A "capital" cost is one that is incurred by a manufacturing business to purchase a piece of equipment that will have a useful lifetime extending beyond the time of purchase. "Recurrent" costs, on the other hand, are incurred for goods or services that are used up as they are bought. The principal cost for schools is the recurrent cost of faculty time since faculty members are paid while they provide their services; the useful lifetime of what is actually purchased simply coincides with the pay period. (In this example we neglect the human capital forming aspect of teacher training colleges.) The cost of a pencil would seem to be a capital costs since, depending on one's penchant for writing, it could last for several months. In fact, pencils are treated as recurrent costs for the reason that their expected lifetime is less than the accounting period (usually one year) of schools. The line between capital and recurrent costs is, then, usually drawn at one year; if the useful lifetime of a piece of equipment is greater than one year, its cost is usually treated as a capital cost. Coombs and Hallak (1972, Chapter 9) point out that schools often adhere only loosely to this one-year convention and provide a valuable practical discussion of how to plan for school building and facilities costs. Much of their discussion applies directly to assessment costs.

How does one construct the cost functions discussed in the preceding section if capital costs are present? For example, an institution invests in in-depth training of faculty in methods of assessment and also invests in preparation of descriptive and instructional materials for the students for a total cost of $50,000. It would clearly be inappropriate to include the entire $50,000 as year 1 cost in attempting to determine the unit cost of assessment in year 1; likewise, it would be inappropriate, in computing year 3 unit costs, to consider the use of written materials and faculty skills as free. In order to construct a useful cost function it it necessary to "annualize" the expenditure on a capital investment.

Two variables are important in annualizing expenditures on capital materials. The first of these is the expected lifetime of the materials, if the materials last n years, a fraction, on the average equal to 1/n, of its cost should be charged to each year. This is "depreciation cost." Similarly, faculty training may last n years before new theories, methods, and techniques lead to its obsolescence.

The second variable that is important in annualizing capital expenditures is the "social discount rate." The social discount rate reflects the value judgment concerning the cost to society of withdrawing resources from consumption now in order to have more consumption later. It is represented as an interest rate because in an important sense the cost of capital is the interest charge that must be paid for its use. One way of obtaining an approximation for an appropriate value for the social discount rate is to examine the private cost of capital. If an institution has invested $50,000 in training and materials for a new program of assessment, the capital thereby committed cannot be used elsewhere, e.g., it cannot be used to construct a laboratory or to add to the endowment to generate income. To see the importance of this, let us assume that the lifetime, n, of the $50,000 of assessment materials if five years and that the institution would be foolish to buy under these circumstances because it could hire (rent) outside assessment experts and materials, and put the $50,000 in a savings bank (or purchase laboratory equipment) and collect interest (or have use of the laboratory). Of course, for most of the time the institution would collect interest on only a part of the $50,000, if it

were paying the $10,000 rent out of this account; nevertheless, if it were receiving 7.5 percent interest, there would be $9,341 left in the bank at the end of the five years, after the payment of $50,000 to hire outside assessment experts and materials.

As this example has indicated, there is a cost (interest charge) involved in having capital tied up in a project, and this cost is measured, to some extent, by the potential rate of return to capital elsewhere in the institution.[3] The total amount of this cost depends, of course, on the amount of capital that is tied up; if the value of the capital in a project is depreciating, as it must be as its lifetime draws to a close, then the amount of capital tied up decreases from year to year. It is thus inappropriate in annualizing capital costs to depreciate the value of initial capital by 1/n and add a capital charge equal to the social rate of discount times the initial value of the capital. One must take into account the changing value of the capital over the project life.

If we take this changing value into account and are given an initial cost, C, for an item of capital expenditure, its lifetime, n, and the social rate of discount, r, the annualized cost of capital is given by $a(r, n)\ C$, where the annualization factor $a(r, n)$ is given by equation 2:

$$a(r, n) = [r(1 + r)^n]/[(1 + r)^n - 1).$$

The derivation of equation 2 would lead us astray from our main purposes; we refer the interested reader to the complete account in Kemeny, Schleifer, Snell, and Thompson (1962, Chapter VI). Figure 5 shows $a(r, n)$ for a number of values of r and n. In the example we have described, where n is five years and the social discount rate is 7.5 percent, the annualization factor a (r, n) is .247, from Figure 5. Multiplying this factor times the total capital expenditure C, gives the result $12,350, which is the real annual cost of the capital expenditure including an interest charge. Although the interest charge is not a cash cost for the school, it should be recognized as the opportunity cost of interest not earned by an investment of the same funds in a savings account.

The purpose of this discussion of the annualization of capital costs is to point out that an investment decision has oppotunity costs, noncash costs, just as the real costs of operating expenses may include both cash costs and opportunity costs. The opportunity cost associated with an investment decision depends on the expected life of the investment, time - n, and the social discount rate, interest charge - r. If all capital costs are annualized in the way suggested here, it becomes possible to compute the annualized values of F and V for the total cost function of Equation 1 (or to compute the parameters of a more complicated cost function). If assessment of the parameters is all that is desired--and that, indeed, is much of what one needs to know--no further theoretical work is necessary.

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[3]The issues involved in determining a value for the social rate of discount are actually rat[illegible] complex and involve consideration of reinvestment of returns as opposed to consumption of th[illegible] The productivity of capital in an econ[illegible]my is a measure of what must be given up to finance a project; there remains the problem of comparing net costs and benefits that occur at different points in time. Dasgupta, Sen, and Marglin (1972, Chapters 13 and 14) review these issues and argue forcibly that a discount rate to make net returns at different points in time comparable reflects a social value judgment. They argue, therefore, that the policy analyst should use a number of social discount rates in order to exhibit clearly the sensitivity of the results to the values chosen, This we do in Figure 5, using annual discount rates of 0 percent, 7.5 percent, and 15 percent.

The purpose of this discussion of the annualization of capital costs is to point out that an investment decision has opportunity costs, noncash costs, just as the real costs of operating expenses may include both cash costs and opportunity costs. The opportunity cost associated with an investment decision depends on the expected life of the investment, time - n, and the social discount rate, interest charge - r. If all capital costs are annualized in the way suggested here, it becomes possible to compute the annualized values of F and V for the total cost function of equation 1 (or to compute the parameters of a more complicated cost function). If assessment of the paramenters is all that is desired--and that, indeed, is much of what one needs to know--no further theoretical work.

Figure 5

Values of the Annualization Factor a(r, n)

n	r = 0%	7.5%	15%
1	1.000	1.000	1.000
2	.550	.557	.615
3	.333	.385	.438
4	.250	.299	.350
5	.200	.247	.298
6	.167	.213	.264
7	.143	.189	.240
8	.125	.171	.223
9	.111	.157	.210
10	.100	.146	.199
11	.091	.137	.191
12	.083	.129	.184
13	.077	.123	.179
14	.071	.118	.175
15	.067	.113	.171

We began the previous section by defining the functions of total cost, average cost, and marginal cost. We then examined the special case where costs can be separated into fixed and variable, and the distinction between capital and recurrent costs. To apply these concepts to real world data concerning processes of assessment of experiential learning, it is necessary to annualize capital costs in a way that appropriately accounts for depreciation and the social rate of discount.[4] The annualized capital costs, plus values for recurrent costs, give the parameters F (fixed) and V (variable) in the simplified total cost function TC(N) = F + VN.

It should be emphasized that the cost function is simply a *summary* of the overall cost behavior of the system; explicit year by year budgets are required for translating broad planning, for which cost functions are useful, into actual resource allocation decisions.

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[4]Jamison, Klees, and Wells (1975) carry the discussion of "treatment of time" one step further to take into explicit account the time structure of student utilization over time.

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Coombs, P. H., and Hallak, J. Managing educational costs. Oxford University Press, 1972.

Dasgupta, P.; Sen, A.; and Marglin, S. Guidelines for project evaluation. UNIDO Project Formulation and Evaluation Series, No. 2. New York: United Nations, 1972.

Jamison, D. T.; Klees, S. J.; and Wells, S. J. Cost analysis for educational planning and evaluation: Methodology and applications to instructional technology. Princeton, NJ: Educational Testing Service, 1975.

Kemeny, J. G.; Schleifer, A., Jr.; Snell, J. L.; and Thompson, G. L. Finite mathematics with business applications. Englewood Cliffs, NJ: Prentice-Hall, 1962.

Kray, E. J. The structure and financing of a program to assess experiential learning. A practicum presented to Nova University in partial fulfillment of the requirements for the degree of Doctor of Education, 1974, pp. 15-20.

Kray, E. J., and Wyman, B. T. Policies, procedures and politics affecting experiential learning. A practicum presented to Nova University in partial fulfillment of the requirements for the degree of Doctor of Education, 1975, pp. 54-61.

Meyer, P. Awarding college credit for non-college learning. San Francisco: Jossey-Bass, 1975, pp. 31-36; 174-178.

Stallings, W. M.; Aleamoni, L. M.; and Heil, D. K. The University of Illinois placement and proficiency system: Description and results. Journal of Higher Education, 1972, vol. 43, no. 8, pp. 610-619.

Willingham, W. W., and Geisinger K. F. Developing an operational model for assessing experiential learning, in W. Willingham and H. S. Nesbitt (Eds.), Implementing a program for assessing experiential learning. Princeton, NJ: Educational Testing Service, 1976, pp.1-15.

APPENDIX A

Description of the CAEL Operational Models Project
as Presented in the Original Proposal

Part III. SPECIFICATIONS FOR COMPONENT C:

OPERATIONAL MODELS

[Part I of the proposal gave an overview of the entire CAEL project and Part II described specifications for Component A (Associational Activities) and Component B (Validation)]. The purpose of this Part III is to spell out in more detail the activities and work proposed in the Operational Component of the overall CAEL plan for 1975-77. It is useful to say a few words about the complementary nature of this component and the one just described (Component B - Validation).

The validation component focused upon the experimental assessment materials per se; that is, the need to try out those materials, to review and improve them, to establish their validity and adequacy, and to produce finally a set of revised assessment guides. But developing effective and workable assessment procedures involves more than producing useful materials. This operational component focuses upon the problems of putting new assessment procedures into place in operating educational programs. Assessment procedures have to be connected effectively with the academic procedures and relationships that exist in ongoing programs--connected so that assessment procedures work well for the institution and the student. The objective of Component C is (1) to develop a dozen institutionally based *Operational Models* for implementing procedures for assessing experiential learning, and (2) to spread the use of those models to a much larger number of institutions.

Rationale

The diversity and autonomy of higher institutions poses a fundamental problem in carrying through the development of improved practices so that they have a beneficial impact on higher education. Diverse solutions that meet local needs are essential, but it is often difficult to spread good programs because they are not articulated in ways that are readily generalizable or there are no effective means for making the work known to other institutions. The basic strategy for accomplishing the objectives of this component of the CAEL proposal is to create a context that deals with these problems. The proposal is to develop *Operational Models* for implementing assessment procedures, and to do it in a working context that will:

a) foster institutional initiative by selecting promising sites from a number of applicants, by imbedding the work in operating programs, and by vesting the responsibility for local models with local institutions;

b) encourage generalizable results by providing a conceptual framework for the task, technical assistance, and a process for keeping model development directed toward a usable product; and

c) offer immediate dissemination through an existing program for implementing new ideas among CAEL Assembly institutions.

Participating institutions will each develop an Operational Model that fits its interests and needs, but all models will share three characteristics:

1) They will utilize a systems approach to understanding implementation problems.

2) They will focus upon one of two major issues--the problem of developing local criterion standards or the problem of cost effectiveness of assessment procedures.

3) They will use one of three current CAEL priotity areas as a substantive referent.

These characteristics can be explained briefly as follows.

1. Systems Approach. Assessment of experiential learning involves a student seeking credit within a programmatic and institutional context. This process is actually a complex *system* of policies, procedures, and individual decisions. It is important that the project tackle the problem from a holistic viewpoint that takes into proper account what problems institutions, faculties, and students have to face in actually assessing and crediting experiential learning toward a degree. In this context a "systems approach" to developing an Operational Model means a systematic analysis of all ways in which an assessment procedure is connected with the educational process. Two types of longitudinal analysis are appropriate. One would focus upon all of the interrelated steps an institution might go through in implementing a new assessment program in experiential learning. Another would focus upon the student's personal experience in moving through the assessment procedure from start to finish. From both perspectives the task implied by a systems analysis would be to identify the critical points in the longitudinal sequence and to specify effective ways of dealing with each point. Examples of critical points include instances where decisions are made or written verifications are required, times when individuals are introduced to new procedures, or occasions when consensus must be reached between appropriate parties. All Operational Models will be characterized by such a systematic analysis of the operational situation in which assessment takes place and an effort to describe desirable procedures for dealing effectively with critical points in the implementation of assessment procedures.

2. Problem Focus. A second important characteristic of each Operational Model will be its focus upon one of two problems: criterion standards or cost effectiveness. Each, for somewhat different reasons, is a major problem in the long-term effective implementation of successful procedures for assessing experiential learning.

Definition of standards is a key issue in reaching individual credit decisions, and there is a corresponding larger issue. When learning experiences differ widely, how can educational standards be publicly understood and maintained? In such circumstances normative standards are obviously inappropriate. It is necessary to define criterion standards that describe what individuals are able to do with different levels of accomplishment in different areas of competency. Depending upon the program and the context, such standards may be defined in reference to individual educational goals, institutional degree requirements, or standards imposed by an external agent such as an employer. In either event, levels of competency thus publicly defined become a powerful instrument in helping students understand their learning goals and their own development and in determining whether diverse educational programs actually succeed in meeting intended objectives. Both outcomes are critical in enhancing the usefulness and the credibility of experiential learning programs.

Increasingly, cost is a dominant issue in designing educational programs. As already noted, the highly individual character of much experiential learning often necessitates assessment that is tailored to the specific learning experience. Consequently, some assessment techniques

may be technically and educationally desirable but unfeasible with respect to their cost benefit character. Assessment needs to be cost effective with respect to its direct benefit to students, its efficiency in institutional operation, and its integrity and value for education generally. Experimental assessment programs can absorb unusual costs, but it is especially important to study carefully the cost implications of new methods of assessment lest developmental effort be expended needlessly on methods that later prove unfeasible due to their expense. Such study needs to involve systematic identification of the basic parameters that differentiate assessment methods, the educational and psychometric strength of each, the direct and indirect cost of each, and the economically reasonable range of alternatives for approaching the assessment of various types of learning. The proposed Operational Models will include practical cost analysis techniques that can be applied to operating assessment programs as one criterion for selection assessment methods and as a basis for justifying the cost of assessment.

3. Priority Area. A third important characteristic of each Operational Model will be the substantive area involved. Each institution will be asked to designate a preferred CAEL priority area for its work: Assessment of Interpersonal Skills, Use of Portfolios to Assess Non-Sponsored Learning, or the Assessment of Learning Outcomes of Work Experience (the fourth CAEL priority area, Use of Expert Judgment, is essentially methodological in nature and applies to all of the previous three). These three priority areas encompass a very broad range of assessment problems. By focusing on one of the three the institution will be able to match its own interest and utilize the developmental work and assessment materials already produced in the first year of the CAEL Project.

In summary, each of the dozen participating institutions will develop an Operational Model that emphasizes a systems analysis of the critical points in the assessment process, both from the standpoint of institutional procedures and the educational experiences of the individual student. Each institution will focus its effort in one of the six cells in Figure 1 below.

	Assessment of Interpersonal Skills	Use of Portfolios to Assess Non-Sponsored Learning	Assessment of Learning Outcomes of Work Experience
Criterion Standards			
Cost Effectiveness			

Figure 1. Six cells within which each participating institution will choose to focus individual Operational Models.

Procedure

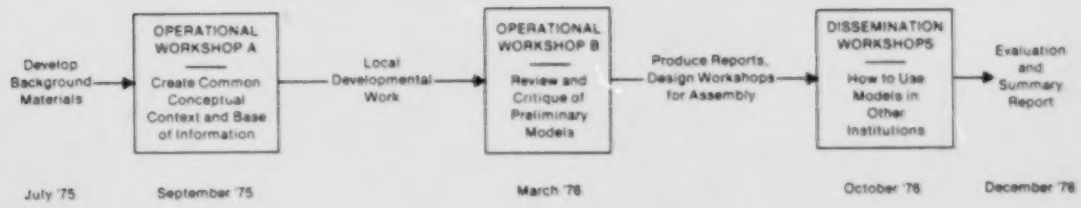
A general plan for implementing the strategy outlined above is shown in Figure 2. Several aspects of this plan are worth noting.

First, the work proposed to develop these Operational Models will deal with real problems in operating programs involving the students, faculty, and others who ultimately have to cope with all aspects of the assessment of experiential learning. Models thus developed are far more likely to be practical and usable than would procedures developed in the abstract.

Second, work on these models will start with a common sense of how to approach the task. Workshop A will provide background information and technical advice as well as thorough discussion of the general characteristics of the intended product that will likely prove useful to other institutions as well as those doing the work. A primary objective of that stage of the project will be to help institutions get a leg up on the problem and a useful sense of direction.

Third, the proposed work involves a recycling of local work on the individual models with group discussion and review of progress toward intended goals. In Workshops A and B the institutional teams meet for intensive discussion with one another and the Project Staff. A month following each of these workshops there will be an additional opportunity for most participants to meet at the CAEL Assembly meetings (October 1975 and May 1976).

Figure 2
General Plan for Developing Operational Models for Implementing Assessment Procedures



Finally, this work is directed not simply toward the preparation of reports describing 12 Operational Models but to the more concrete demands of dissemination workshops following model development. These dissemination workshops will focus on giving institutions something they can try out on their own campus, and the development of Operational Models will be pointed consciously toward that objective.

The following steps provide more detailed specification of the anticipated procedures in accomplishing the objectives of the work proposed.

1 - Solicitation of institutional applicants from CAEL Assembly

July 75

2 - Plan Workshop A

3 - Committee selection of participating institutions

Aug 75

4 - Development of materials for Workshop A

5 - OPERATIONAL WORKSHOP A. Development of general conceptual framework and background information base (1/2 day sessions on the nature of the longitudinal model, cost

Sept 75

effectiveness, criterion standards, the three priority assessment areas, desirable characteristics of the intended products)

6 - Follow-up meeting of Project Directors with staff (at CAEL Assembly meeting)

Oct 75

7 - Disseminate selected Workshop A materials to Assembly members

Nov 75

8 - Institutions work on individual Operational Models (continuing through winter and spring). Limited site visits for consultation

Dec 75

Jan 76

9 - Plan Workshop B

Feb 76

10 - OPERATIONAL WORKSHOP B. Preliminary reports on individual model development. Mutual sharing and review of progress; plus staff feedback. Dual purpose of

Mar 76

strengthening individual models and directing each toward a product that can be effectively communicated to and used by other institutions. Discuss fall workshops

11 - Develop general plan for fall workshops

Apr 76

May 76

12 - Follow up meeting of Project Directors with staff (at CAEL Assembly meeting). Discuss plans for fall workshops

June 76

13 - Institutions submit final reports (description of the Operational Models). Preparation of interim progress report

July 76

14 - Staff review and decision of CAEL Executive Committee regarding publication

Aug 76

15 - Copy editing by staff; revisions by authors

Sept 76

16 - Production of CAEL Working Papers to disseminate Operational Models approved for publication by CAEL Executive Committee

Oct 76

17 - Series of DISSEMINATION WORKSHOPS at fall meeting of CAEL Assembly. Project Audit Committee prepares evaluation report.

Nov 76

18 - Completion of overall project evaluation

Dec 76

19 - Preparation of Summary report

Staffing and Institutional Participation

As is true in the case of other components of this joint proposal, the proposed work will be carried out under the direction of the CAEL Steering Committee or the Executive Committee acting in their behalf. Policy responsibility of the Steering Committee extends to all substantive and organizational aspects of the project within the terms of this and related proposals. All publications, for example, are approved by the Steering Committee. ETS staff and institutional teams will carry out the work of the project as specified in this section and in the budget narrative.

With respect to staffing, continuity will be maintained so that the work proposed will build upon and profit from the working relationships and considerable experience already attained. Warren Willingham and Richard Burns will serve as Project Director and Associate Project Director respectively as has been the case since the inception of the project. John Valley will continue to serve as Director of CAEL Assembly activities. An educational economist and a specialist in criterion-referenced measurement will be assigned part time to the project to provide technical assistance. A member of the ETS Program Direction staff will provide continuing professional support for this activity. Other ETS consultants, editors, and support staff will be called in as necessary. ETS staff will serve the following functions:

1) General administrative responsibility for planning and coordinating the project, especially so that it complements and profits from other CAEL work.

2) Technical assistance in providing background information relevant to model development and a general framework and plan for designing models and helping other institutions use them.

3) Review and critique to assist institutions in producing reports that will prove generally useful and sound.

4) All support functions necessary for meeting arrangements, preparation of workshop materials, production of publications, etc.

Participating institutions will be selected as follows. All CAEL Assembly institutions will receive a description of the proposed activity, the conditions and responsibilities involved, and an invitation to apply. Conditions of the application will include such understandings as (1) the institution's willingness to support the study and to provide the local endorsement and release time that may be necessary, (2) the financial support and technical assistance that can be expected from the CAEL project, (3) an agreement to produce a final report along the lines indicated. Each applicant will be asked to provide brief information about its relevant programs and its qualifications.

The CAEL Executive Committee will appoint an *ad hoc* selection committee of knowledgeable educators not closely connected with the CAEL project or any applicant institution. The committee will review all applications and select 12 institutions that offer most promise for developing a useful Operational Model. The committee will balance insofar as possible the interests of the applicant (in order to represent each of the cells in Figure 1), the type of institution, and geographical area.

Expected Outcomes and Evaluation

As stated in Part I of this proposal, the anticipated outcomes of the operational component are as follows:

1) Greatly strengthened assessment expertise on a dozen cooperating campuses through intensive involvement in working out practical applications of experimental assessment procedures.

2) Specific techniques for implementing improved assessment methods at any institution with particular focus on ways to define local standards and cost effectiveness.

3) Published models of institutional applications of assessment procedures, carried out in operating situations and giving special attention to the educational problems of students moving through programs.

4) Actual use of newly developed operational assessment procedures at a substantial number of CAEL Assembly institutions with resulting direct benefit to students.

The operational component builds in procedures for extensive review and critique throughout all stages of the project. The general plan has built into its structure mechanisms to insure that the individual Operational Models remain "on-target" and that the overall activity is directed toward products and dissemination activities that will prove useful to other institutions. It is also important to evaluate the overall success of the project on an independent basis. The following criteria will be used in evaluating this component. The activity will be judged successful if:

1) institutions do participate fully, devoting staff time to the project and turning out reports on schedule;

2) reports do meet high standards of quality;

3) faculty and staff of participating institutions judge the project a benefit to their institution;

4) dissemination workshops are well attended and judged to be useful by those attending;

5) significant numbers of institutions report plans to try out models on their own campuses;

6) in the eyes of competent, objective judges the project has made a substantial and significant contribution to increased knowledge and understanding of assessment of experiential learning.

Evaluation will be both formative and summative. Step 10 in the procedures outlined previously (Workshop B) reflects a major effort to incorporate formative evaluation at a critical stage in the project when the work of the individual institutions can profit from mutual review and technical assistance. Steps 6, 12, and 14 among the procedures listed are also important mechanisms for evaluating progress and redirecting effort.

A summative evaluation of this component will be carried out through the following steps.

1) The staff will collect (a) information from the 12 participating institutions regarding their impressions of the value of the project to the institution; (b) reactions of participants in the dissemination workshops regarding the value of the workshops, the quality

of the materials, and whether their institution is likely to put the Operational Models to direct use; and (c) other information as may be relevant to criteria 1 through 6 above.

2) A project audit committee will be appointed consisting of several prominent educators concerned with problems of assessing and crediting experiential learning. This group will meet at the time of the dissemination workshops in order to review project materials, observe the workshops, discuss the project with institutional representatives, and prepare a report for the CAEL Steering Committee.

3) The report of the project audit committee will be included with that of the Project Director in an overall evaluation in a final summary report of the project. An interim report will also be prepared at the end of the first year. These reports plus all pertinent documents produced by the project will be submitted to the funding agent as they are produced.

APPENDIX B

Selected Bibliography—Briefly Annotated

The following references are organized according to the 13 components shown in Figure 2 of the Willingham/Geisinger paper (page 12). This is by no means a comprehensive bibliography as indicated by the brief annotations. The intention in selecting these limited references was merely to identify a few items that provide an overview of a topic or are especially useful for some particular reason.

COMPONENT NO. 1 - RATIONALE

Berg, Ivar. Education and jobs: The great training robbery. New York: Praeger, 1970.
Challenges the common assumption of employers, economists, and educators that improved levels of traditional education lead to improved job performance.

Breen, Paul; Donlon, Thomas; and Whitaker, Urban. The learning and assessment of interpersonal skills: Guidelines for administrators and faculty. CAEL Working Paper No. 4. Princeton, N.J.: Educational Testing Service, 1975.
Provides a good illustration of the statement of an explicit rationale for crediting a type of learning frequently not imagined to be a part of the undergraduate curriculum (see pages 13-14 especially).

Chickering, Arthur W. Education and identity. San Francisco: Jossey-Bass, 1969.
Describes ways of shifting the focus in higher education from concern for the disciplines to concern for persons.

Commission on Non-Traditional Study. Diversity by design. San Francisco: Jossey-Bass, 1973.
Clarifies the problem of articulation between experiential learning and traditional curricula and identifies the need for accepted means of granting credit for off-campus learning.

Hoyt, Kenneth B. An introduction to career education. A Policy Paper of the U.S. Department of Health, Education, and Welfare. Washington, D.C.: HEW, 1974.
Describes the conditions and criticisms behind the demand for educational reform, presents a rationale for career education as an answer, and suggests basic policy changes for postsecondary institutions.

Keeton, Morris T. (Ed.) Assessment of experiential learning. San Francisco: Jossey-Bass, (in press).
A group of CAEL commissioned papers which give more direct attention to the rationale of experiential learning than any other current source. The introductory chapter by Keeton, the historical perspective by Houle, and the essay by Tumin are especially concerned with philosophical underpinnings.

Organisation for Economic Co-operation and Development, Centre for Educational Research and Innovation. Recurrent education: A strategy for lifelong learning. Washington, D.C.: OECD, 1973.
Describes the rationale for recurrent education--a more fully developed concept than the traditional notion of continuing education--and discusses program development in other countries.

Scribner, Sylvia, and Cole, Michael. Cognitive consequences of formal and informal education. Science, November 9, 1973, vol. 182, pp. 553-559.

Points up some of the differences between formal classroom education and the kinds of learning that take place in the field.

Vermilye, Dyckman W. (Ed.) Lifelong learners: A new clientele for higher education. Current Issues in Higher Education, 1974. San Francisco: Jossey-Bass, 1974.

Illustrates how higher education can serve more people by restructuring the ways students are served and by broadening the concept of "student" to include older learners, part-time learners, and off-campus learners.

COMPONENT NO. 2 - PROGRAM CHARACTERISTICS

Cooperative Assessment of Experiential Learning. CAEL Resource Book. Princeton, N.J.: CAEL, Educational Testing Service, 1974-75.

A loose-leaf binder containing thumbnail descriptions of a number of organizations and agencies connected in some way with experiential learning and brief (usually two to three pages) annotations of experiential learning programs in some 50 CAEL institutions.

Cross, K. Patricia; Valley, John R.; and Associates. Planning non-traditional programs: An analysis of the issues for postsecondary education. San Francisco: Jossey-Bass, 1974.

Prepared for the Commission on Non-Traditional Study. Presents findings from a series of research projects on the interests of nontraditional students, institutional offerings, alternative instructional delivery systems, and the issues of credit and accreditation.

Duley, John (Issue Ed.) Implementing field experience education. New Directions for Higher Education, vol. 2, no. 2. San Francisco: Jossey-Bass, 1974.

Discusses a variety of program characteristics--not through program descriptions per se but through essays on the distinctive roles of different individuals, different aspects of program development, and how innovative efforts are best organized and evaluated.

Hall, Laurence, and Associates. New colleges for new students. San Francisco: Jossey-Bass, 1974.

Describes sixteen colleges with unusual approaches to serving "new" students.

Houston, W. Robert. Exploring competency based education. Berkeley, Calif.: McCutchan, 1974.

A useful collection of different approaches to competency based education covering theory as well as practice.

Knapp, Joan. A guide for assessing prior experience through portfolios. CAEL Working Paper No. 6. Princeton, N.J.: Educational Testing Service, 1975.

A report based upon a fairly comprehensive survey of existing programs concerned with crediting prior learning. Complements the book by Peter

Meyer (see Component No. 8) in providing a structured set of alternative possibilities for program development.

Mayhew, Lewis B. Higher education for occupations. SREB Monograph No. 20. Atlanta: Southern Regional Education Board, 1974.

Based on a study of curricular and instructional changes being implemented in undergraduate American colleges in programs designed to prepare students for occupations or careers.

Ray, Robert F. The C.I.C. study of the non-traditional student. Report No. 1. University credit and degree-earning opportunities for adults. Iowa City: Division of Extension and University Services, University of Iowa, 1973.

Describes several kinds of opportunities available to part-time students over the age of 25 for earning credits and degrees.

Ruyle, Janet, and Geiselman, Lucy Ann. Non-traditional opportunities and programs, in K. Patricia Cross; John R. Valley; and Associates, Planning non-traditional programs: An analysis of the issues for postsecondary education. San Francisco: Jossey-Bass, 1974, pp. 53-94.

Provides useful statistical information on the prevalence of various credit and assessment practices concerning different types of nontraditional learning.

Sharon, Amiel T. A task-based model for assessing work experience. CAEL Working Paper No. 8. Princeton, N.J.: Educational Testing Service, 1975.

Provides a general discussion of approaches to the assessment and crediting of work experience. Describes in detail a method involving competency checklists.

Valley, John R. Increasing the options: Recent developments in college and university degree programs. Princeton, N.J.: Educational Testing Service, 1972.

Contains descriptions of exemplary nontraditional degree programs developed since 1969.

Willingham, W.; Burns, R.; and Donlon, T. Current practices in the assessment of experiential learning. CAEL Working Paper No. 1. Princeton, N.J.; Educational Testing Service, 1974.

Reports the initial CAEL survey of experiential learning programs. Some of the data are out of date by now, but some of the discussion and the general structure of the report may still prove useful.

COMPONENT NO. 3 - FACULTY RESOURCES

Avila, Donald L.; Combs, Arthur W.; and Purkey, William W. (Eds.) The helping relationship sourcebook. Boston: Allyn and Bacon, 1971.

A collection of articles from the field of humanistic psychology providing background information relevant to the assessment of interpersonal skills.

Chapters by Arthur Combs and Donald Snygg contain especially helpful ideas concerning the trainability of such skills.

Dressel, Paul L; Johnson, F. Craig; and Marcus, Philip M. The confidence crisis: An analysis of university departments. San Francisco: Jossey-Bass, 1970.

Based partially on the findings of a research project. Explores some of the problems and concerns of faculty in the context of their operational unit, the department.

Group for Human Development in Higher Education. Faculty development in a time of retrenchment. New Rochelle, N.Y.: Group for Human Development in Higher Education and Change Magazine, 1974.

Recommends a system of supports for college teaching effectiveness, based on a network of new kinds of relationships between teacher and colleagues, students, administrators, and learning experts. Development activities would be coordinated through a campus teaching institute.

Lewis, Robert; Comegys, Elaine; Shepard, Loraine; and Groves, Shannon. The use of expert judgment in the assessment of demonstrated learning in the Antioch Yellow Springs adult degree completion program. CAEL Institutional Report No. 1. Princeton, N.J.: Educational Testing Service, 1975.

Includes especially useful, candid discussion of a number of faculty concerns pertaining to assessment of experiential learning.

Reilly, Richard. The use of expert judgment in the assessment of experiential learning. CAEL Working Paper No. 10. Princeton, N.J.: Educational Testing Service, 1975.

Deals mostly with assessment methods, but also gives some attention to the question of identifying experts and what role the assessor should play.

Whitaker, Urban G. Who are the assessors? In Morris T. Keeton (Ed.), Assessment of experiential learning. San Francisco: Jossey-Bass, (in press).

Presents a six-step model for the selection of assessors based on identification and analysis of participants, functions, and characteristics, as well as the critical relationships among these variables.

COMPONENT NO. 4 - CRITERION STANDARDS

Berte, Neal R. (Issue Ed.) Individualizing education by learning contracts. New Directions for Higher Education, vol. 3, no. 2. San Francisco: Jossey-Bass, 1975.

A set of articles relating learning contracts to the movement toward individualization of education. Among the topics covered are: how learning contracts shift authority from institutions to individuals, how learning contracts can be used to develop intellectual competence, translating goals and objectives into contracts and experiences, relating theory to practice via contracts, effects on students and faculty,

role of student advising, individualized evaluation, and the future of learning contracts.

Knapp, Joan, and Sharon, Amiel T. A compendium of assessment techniques. Princeton, N.J.: CAEL, Educational Testing Service, 1975.

Provides descriptions of assessment techniques, illustrations of possible applications, a discussion of development procedures, a psychometric review, an overall evaluation, and references for further study.

Messick, Samuel. The standard problem: Meaning and values in measurement and evaluation. American Psychologist, 1975, vol. 30, pp. 955-966.

Addresses a number of fundamental issues regarding the use of tests for evaluation, with particular emphasis on the problem of test validity. Some training in measurement is needed to read the article without difficulty.

Reilly, Richard. The use of expert judgment in the assessment of experiential learning. CAEL Working Paper No. 10. Princeton, N.J.: Educational Testing Service, 1975.

From the Preface: "...practical methods and procedures are suggested that can help institutions make more effective use of expert judgment...some examples of approaches to assessment are presented that would, with some modifications, be suitable for application at an institution where experiential learning must be assessed."

Serling, Albert M. Evaluating experiential learning. Paper presented at the Institute for Undergraduate Curricular Reform, Queens College, Charlotte, N.C., March 1975.

A review of a number of issues associated with awarding credit for experiential learning. Includes an overview of the evaluation approach used at Empire State College.

Wilds, Claudia P. The oral interview test, in Randall L. Jones and Bernard Spolsky (Eds.), Testing language proficiency. Arlington, Va.: Center for Applied Linguistics, 1975.

Describes the testing procedures and evaluation techniques associated with a rating system for evaluating speaking proficiency in a foreign language. Ratings are made on a numerical scale wherein each point has a careful and detailed definition, in both linguistic and functional terms.

Willingham, Warren W. Critical issues and basic requirements in the assessment of experiential learning, in Morris T. Keeton (Ed.) Assessment of experiential learning. San Francisco: Jossey-Bass, (in press).

Provides a checklist of basic measurements that should be reflected in any sound assessment system.

COMPONENT NO. 5 - ADMISSIONS

Campbell, L. Howard, and Hahn, Walter. Readmission of former students after absence from the campus: Problems and opportunities. College and University, 1962, vol. 37, pp. 126-134.

Makes a case for readmission of former students partly on the basis of evidence that students involved in "activities of import" during their absence from education are likely to succeed when readmitted.

Knoell, Dorothy M. Are our colleges really accessible to the poor? Junior College Journal, 1968, vol. 39, pp. 1-11.

An especially informative article dedicated to a humane and relevant admissions process. Identifies procedural hurtles that tend to discourage disadvantaged students from attending even open-door colleges.

Ward, Lewis B. The interview as an assessment technique, in College Entrance Examination Board, College admissions, 2. New York: College Entrance Examination Board, 1955, pp. 62-71.

Cites research evidence questioning the value of admissions interviews for the purpose of evaluating whether or not a student is likely to succeed if admitted. Argues that the interview should be judged for its value in personalizing education, its use for informational purposes, and its effect on the motivation and morale of students.

W[illingham], Warren W., et al. The source book for higher education: A critical guide to literature and information on access to higher education. New York: College Entrance Examination Board, 1973.

Includes some 1500 references to the literature of admissions and a broader array of issues concerning access to higher education. Organized according to a taxonomy incorporating 85 categories of information.

COMPONENT NO. 6 - FINANCING

Houle, Cyril O. The external degree. San Francisco: Jossey-Bass, 1973, pp. 132-137.

Discusses some issues to be considered in financing nontraditional programs.

Kray, E. J., and Wyman, B. T. Policies, procedures and politics affecting experiential learning. A Practicum Presented to Nova University in Partial Fulfillment of the Requirements for the Degree of Doctor of Education, 1975.

Chapter entitled "Summary and Recommendations" includes practical section on business, financial, and funding problems.

Meeth, L. Richard. The impact of state and federal funding regulations on nontraditional postsecondary education: A summary. Institute for Educational Leadership, George Washington University, 1975.

Summarizes a study that shows how nontraditional programs are at a disadvantage compared to traditional programs in terms of the criteria used in federal and state funding formulas and policies. Recommends restructuring formulas and guidelines to take into account the special features and purposes of nontraditional education.

Meyer, Peter. Awarding college credit for non-college learning. San Francisco: Jossey-Bass, 1975.

Reports results of a survey of current practices, touching on sources of revenue, students' perceptions of the fairness of the cost to them, and faculty compensation. Guidelines and recommendations also consider cost issues.

Stallings, William M.; Aleamoni, Lawrence M.; and Heil, D. K. The University of Illinois placement and proficiency system: Description and results. Journal of Higher Education, 1972, vol. 43, no 8, pp. 610-619.

Discusses complexities of cost-benefit analyses of placement and proficiency testing and gives some unofficial cost estimates for the system at the University of Illinois.

COMPONENT NO. 7 - PREPARATION FOR ASSESSMENT

Bolles, Richard N. What color is your parachute? A practical manual for job hunters and career changers. Berkeley, Calif.: Ten Speed Press, 1972.

Presents a new approach to job hunting based upon careful self-evaluation and the assessment of personal goals, skills, and desires.

Breen, Paul; Donlon, Thomas; and Whitaker, Urban. The learning and assessment of interpersonal skills: Guidelines for students. CAEL Working Paper No. 5. Princeton, N.J.: Educational Testing Service, 1975.

A student counterpart to the faculty guide, CAEL Working Paper No. 4. Both give special attention to the problem of how students orient themselves to their personal and educational goals and thereby plan more effective learning experiences.

Duley, John (Issue Ed.) Implementing field experience education. New Directions for Higher Education, vol. 2, no. 2. San Francisco: Jossey-Bass, 1974.

An authoritative collection of papers originally developed for the 1973 conference of the Society for Field Experience Education.

Forrest, Aubrey. A student handbook on preparing a portfolio for the assessment of prior experiential learning. CAEL Working Paper No. 7. Princeton, N.J.: Educational Testing Service, 1975.

Presents a useful approach to portfolio development which incorporates suggestions for two especially difficult tasks: identifying significant prior learning and relating it to a future learning plan.

Mayville, William. Contract learning. ERIC Higher Education Research Currents, December 1973.
Outlines the general nature of learning contracts and describes how they are used at Minnesota Metropolitan State College (now Metropolitan State University), Community College of Vermont, and Empire State College in New York.

Nesbitt, Hadley. A student guide to learning through college-sponsored work experience. CAEL Working Paper No. 9. Princeton, N.J.: Educational Testing Service, 1975.
Includes a number of suggestions and work sheets helpful for planning work experience learning.

Permaul, Jane S.; Steele, Joan; Miko, Marina; and Hayes, Laird. Evaluation and expert judgment. CAEL Institutional Report No. 3. Princeton, N.J.: Educational Testing Service, 1975.
Develops the "daily log" as a systematic means of recording and reflecting upon experiential learning as an ongoing process.

COMPONENT NO. 3 - APPRAISAL OF LEARNING OUTCOMES

Boyd, Joseph L., Jr., and Shimberg, Benjamin. Handbook of performance testing: A practical guide for test makers. Princeton, N.J.: Educational Testing Service, 1971.
Developed to serve as a tool for vocational educators in planning and preparing performance measures for evaluating behavioral outcomes.

Bray, Douglas W., and Grant, Donald L. The assessment center in the measurement of potential for business management. Psychological Monographs: General and Applied, 1966, vol. 80, no. 17, whole no. 625.
Provides a basic psychometric evaluation of the assessment center concept as developed at American Telephone and Telegraph.

Breen, Paul; Donlon, Thomas; and Whitaker, Urban. The learning and assessment of interpersonal skills: Guidelines for administrators and faculty. CAEL Working Paper No. 4. Princeton, N.J.: Educational Testing Service, 1975.
Recommends the use of several assessment techniques in a highly flexible approach for evaluating interpersonal competence.

Buros, Oscar Krisen (Ed.) The seventh mental measurements yearbook. Highland Park, N.J.: Gryphon Press, 1972, 2 vols.
The primary source of information on standardized achievement and performance tests.

Coffman, William E. On the reliability of ratings of essay examinations. NCME Measurement in Education, 1972, vol. 3, no. 3.

Presents, in laymen's terms, a succinct description of the issues surrounding reliable grading of essay examinations.

Fear, Richard. The evaluation interview (2nd ed.) New York: McGraw-Hill, 1973.

Discusses interview techniques applicable to educational situations in which a faculty member wishes to determine the nature and extent of a student's knowledge of a particular topic.

Fitzpatrick, Robert, and Morrison, Edward J. Performance and product evaluation, in Robert L. Thorndike (Ed.), Educational measurement (2nd ed.) Washington, D.C.: American Council on Education, 1971, pp. 237-270.

An especially good reference for assessment techniques appropriate for evaluating a person's ability to demonstrate a skill or the tangible outcome of a skill.

Knapp, Joan. A guide for assessing prior experience through portfolios. CAEL Working Paper No. 6. Princeton, N.J.: Educational Testing Service, 1975.

Systematically outlines various alternatives in the use of portfolios as an assessment technique.

Knapp, Joan, and Sharon, Amiel. A compendium of assessment techniques. Princeton, N.J.: CAEL, Educational Testing Service, 1975.

Summarizes briefly nine different types of assessment (e.g., performance tests, essay examinations, interviews, product assessment, etc.) Provides supplementary references.

Meyer, Peter. Awarding college credit for non-college learning: A guide to current practices. San Francisco: Jossey-Bass, 1975.

Focuses on faculty involvement in the assessment and crediting of prior experiential learning at the undergraduate level.

Minnesota Metropolitan State College. Individualized educational planning. St. Paul, Minn.: MMSC, 1975.

Text for a course in individualized educational planning. Prepares the new student at MMSC to write his of her own degree plan by identifying goals and demonstrating competences (learning outcomes). The chapter on Evidence of Competence describes some specific assessment techniques.

Payne, David A. (Ed.) Curriculum evaluation: Commentaries on purpose, process, product. Lexington, Mass.: D. C. Heath, 1974.

Contains several excellent articles that are directly relevant to assessing experiential learning.

Permaul, Jane S.; Steele, Joan; Miko, Marina; and Hayes, Laird. Evaluation and expert judgment. CAEL Institutional Report No. 3. Princeton, N.J.: Educational Testing Service, 1975.

Illustrates how a structured daily log can provide the basis for an informed assessment of learning outcomes.

Reilly, Richard. The use of expert judgment in the assessment of experiential learning. CAEL Working Paper No. 10. Princeton, N.J.: Educational Testing Service, 1975.

Discusses a variety of techniques and problems concerning the use of expert judgment (e.g., technical issues of validity and reliability, the interview as an assessment technique, product assessment, and performance assessment).

Sharon, Amiel T. A task-based model for assessing work experience. CAEL Working Paper No. 8. Princeton, N.J.: Educational Testing Service, 1975.

Describes especially well the use of competence checklists as an assessment technique.

Thorndike, Robert L. (Ed.) Educational measurement. (2nd ed.) Washington, D.C.: American Council on Education, 1971.

Since its first publication in 1951, regarded as one of the leading reference works in the theory and techniques of educational measurement.

Willingham, Warren W. College placement and exemption. New York: College Entrance Examination Board, 1974.

Uses decision theory, particularly the notion of trait-treatment interactions, to develop a framework of 12 models for sorting students into groups for more effective instruction and learning. See Chapter 6 for a general discussion of three approaches to recognition of prior learning--examination, accreditation, and documentation.

COMPONENT NO. 9 - INTEGRATION OF LEARNING WITH FUTURE PLANS

Laramee, William A. Educational debriefing. CAEL Special Project Report from Berea College, in CAEL Resource Book. Princeton, N.J.: CAEL, Educational Testing Service, 1975.

Treats "debriefing" as a systematic means of identifying experiential learning outcomes and mid-stream corrections in order to better focus learning experiences.

Nesbitt, Hadley. A student guide to learning through college-sponsored work experience. CAEL Working Paper No. 9. Princeton, N.J.: Educational Testing Service, 1975.

Makes specific suggestions concerning the problem of helping students to understand learning outcomes of off-campus experiences and to relate those outcomes to a subsequent learning plan.

COMPONENT NO. 10 - OFF-CAMPUS LEARNING

Dressel, Paul L., and Thompson, Mary M. Independent study: A new interpretation of concepts, practices, and problems. San Francisco: Jossey-Bass, 1973.

Defines independent study; describes current activity in this field, including case studies; and analyzes the obstacles, the requirements for success, and the needs for research in managing independent study.

Duley, John (Issue Ed.) Implementing field experience education. New Directions for Higher Education, vol. 2, no. 2. San Francisco: Jossey-Bass, 1974.

An authoritative collection of papers originally developed for the 1973 conference of the Society for Field Experience Education.

Friedland, William H. The use of field study in undergraduate education. Paper prepared for the panel, "Teaching Undergraduate Sociology: Reflections and Innovations," at the meeting at the American Sociological Association, New York, August 27, 1973.

Describes the Community Studies program of the University of California, Santa Cruz, in which students delineate a field project, take courses in preparation, spend six months full-time in the field, and consolidate the learning experience by preparing a senior thesis.

Hart, Michael A. A handbook for students; A handbook for agencies; A handbook for faculty. Atlanta: Georgia Intern Program, (no date).

Three separately bound reports containing a variety of useful information on intern programs.

Kiel, David H. Student learning through community involvement: A report on three studies of the service-learning model. Atlanta: Southern Regional Education Board, 1972.

Provides a wealth of information from 100 students concerning their impressions of learning opportunities, learning relationships, and learning outcomes in an internship experience.

Meyer, Peter, and Petry, Sherry L. Off-campus education: An inquiry. Atlanta: Southern Regional Education Board, 1972.

A conference report that identifies some objectives of off-campus education and summarizes some considerations concerning assessment.

Nesbitt, Hadley. A student guide to learning through college-sponsored work experience. CAEL Working Paper No. 9. Princeton, N.J.: Educational Testing Service, 1975.

Outlines and describes "11 basic steps to a useful learning experience." Includes checklists and forms.

Southern Regional Education Board. Service-learning in the South: Higher education and public service 1967-1972. Atlanta: SREB, 1973.

A collection of 13 articles on the development of the service-learning concept, the translation of the concept into five state programs, and the results of practiced approaches to the evaluation of service-learning.

COMPONENT NO. 11 - STUDENT ADVISING

Bolles, Richard N. What color is your parachute? A practical manual for job hunters and career changers. Berkeley, Calif: Ten Speed Press, 1972.

Presents a new approach to job hunting based upon careful self-evaluation and the assessment of personal goals, skills, and desires.

Crystal, John S., and Bolles, Richard N. Where do I go from here with my life? New York: Seabury Press, 1974.

A 16-lesson course--complete with homework assignments--in determining vocational and life goals and how to achieve them.

Hardee, Melvene D. Faculty advising in colleges and universities. Student Personnel Series No. 9. Washington, D.C.: American College Personnel Association, 1970.

A useful monograph by a long recognized authority; describes the status of this often neglected area.

COMPONENT NO. 12 - CREDIT POLICY

Warren, Jonathan R. Awarding credit, in K. Patricia Cross; John R. Valley; and Associates, Planning non-traditional programs: An analysis of the issues for postsecondary education. San Francisco: Jossey-Bass, 1974, pp. 116-147.

Provides a good discussion of the relationship between means of assessment and means of crediting.

Willingham, Warren W. College placement and exemption. New York: College Entrance Examination Board, 1974.

Gives a brief history of the development of ways in which learning acquired in one institution is recognized (credited) in another.

COMPONENT NO. 13 - RECORD OF LEARNING OUTCOMES

Forrest, Aubrey; Ferguson, Richard L.; and Cole, Nancy S. The narrative transcript: An overview. Educational Record, Winter 1975, vol. 56, no. 1, pp. 59-65.

Seven types of narrative transcripts (written reports of student attainment) are described and their advantages and disadvantages discussed.